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American Writing Files Reorganization Plans

Objectives Include Additional Working Capital, Elimination of Cost of Carrying Idle Properties Which Are to be Abandoned and a Substantial Decrease in Fixed Interest Charges—Thomas H. Blodgett Is to Become Chairman of the Board and Sidney L. Willson Has Consented to Continue in a Capacity To Be Determined

Provision for additional working capital, elimination of the cost of carrying idle properties which are to be abandoned, and a substantial decrease in fixed interest charges are the objectives of a plan of reorganization of the American Writing Paper Company, Inc., which has been filed in the United States District Court of Massachusetts in proceedings under Section 77B.

The plan provides for formation of a new company in which will be vested substantially all existing properties of the paper company except three mills in Holyoke and two mill sites in Connecticut. This new company will issue its securities in exchange for those of the old company and in settlement of its indebtedness and to provide new money.

Loan from Reserve Bank

Money for carrying out the plan, the company states, is assured by an agreement of the Federal Reserve Bank of Boston to advance $500,000 to the new company, under certain conditions, following completion of the reorganization; and by assurance that Thomas H. Blodgett and associates will acquire $100,000 of second mortgage bonds and accompanying shares of stock to the extent that these may not be subscribed by creditors and stockholders.

First right to subscribe to these second mortgage bonds, which may be issued in the amount of $500,000 and accompanied by 25,000 shares of common stock, is given to holders of existing first mortgage bonds. The subscription price is fixed at $100 for each $100 principal amount of bonds and five shares of new common.

Additional Loan Later

Under certain conditions, and provided at least $100,000 is subscribed under these provisions in addition to the $100,000 undertaken by Blodgett, the Federal Reserve Bank of Boston may at a later date advance an additional $500,000 against a second series of secured notes of the company.

Capitalization of the new company will consist of $1,000,000 of twenty-four first mortgage 6s, the total authorization of these bonds being limited to $2,000,000; $1,000,000 of secured notes, at not more than 5 per cent interest, $500,000 of ten-year 5 per cent second mortage bonds, $2,840,000 of general mortgage bonds, due January 1, 1961, the interest rate on which will be determined by an "available income" formula for at least the first five years and will later be established at 6 per cent; and 450,000 shares of no-par value common stock.

Provisions of Exchange

Holders of existing first mortgage bonds will receive for each $1000 principal amount $500 in new general mortgage bonds and fifty-six shares of new common. Holders of unsecured debt not entitled to priority payment will receive in cash 25 per cent of their debt as at June 25, 1934; general mortgage bonds in principal amount equal to 20 per cent of that amount; and new common at the rate of five shares for every $100 of such debt as at January 1, 1936; with the proviso that holders of debt less than $100 in amount as at June 25, 1934, may take cash in such amount. Holders of existing preferred stock will receive one share of new common for each two shares of preferred held, while holders of common stock will receive one share of new for each twenty shares of existing common.

Officers and Board of Directors

Mr. Blodgett is to become chairman of the board of the new company and Sidney L. Willson, president of the old company, has consented to continue in a capacity to be determined by its board of directors. They will serve as directors with D. Samuel Gottesman, Elbert A. Harvey, Frank S. Shaw, George E. Warren and Oliver Wolcott.

The American Writing Paper Company, Inc., reports for the eleven months ended Nov. 30, 1935, net loss of $289,734 after taxes, depreciation and interest. Gross sales amount to $5,358,329.

Prominent Mills Purchase Haug Refiners

Three Haug refining units, manufactured by Anton J. Haug, manufacturers of pulp mill machinery, Nashua, N. H., have been purchased by the Newfoundland International Power and Paper Company. A second unit has been purchased by the New Brunswick International Paper Company for the Dalhousie mill, where one unit has been in operation for some time. Another unit has been purchased by the Escanaba Paper Company, of Escanaba, Mich.

Newsprint Paper Demand Increases In Canada

Several Plants Working Close to Capacity to Meet Larger Requirements—Consumption In United States and South America Expands Materially—Some of Larger Producers Making Arrangements for Re-Opening Idle Mills—Spot Market Very Firm.

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., January 6, 1936.—The Canadian pulp and paper industry enters the New Year with many indications that as a whole it is rapidly working into a new and sounder position. The main factor in the improved outlook is the greatly increased demand which has developed for newsprint.

While this increase in demand has come principally from the United States, which is by long odds the largest customer of the Canadian mills, there has likewise been a marked increase in the market for this product in South America, where the circulation of newspapers has been increasing by leaps and bounds.

Already it has been found that the demand for the product of Canadian mills has increased to such an extent that several are working close to capacity, and some of the larger producers are making arrangements for reopening plants which had been closed down.

It is believed here that it will not be long before the Canadian producers who have hitherto lacked tonnage will secure all the business they can handle.

While the contract price set for 1936 has been a great disappointment, there is said to be evidence that some of the publishers are already in the spot market to provide for their increased requirements and will be bidding substantially higher prices for the larger amounts required at certain periods of the year.

In view of these important developments it is felt that it will not be long before plans are worked out for the reorganization of such companies as Abitibi, Price Bros., Consolidated Paper, etc.

Howard Smith Arrears Plan Submitted

An immediate resumption of dividends on the preferred stock of Howard Smith Paper Mills in the event of shareholders granting their approval of the plan to be submitted for extinguishing arrears of dividends accrued on the senior security is forecast by Harold Crabtree, president of the company, in presenting details of the proposed plan to shareholders.

A special general meeting has been called for February 12 next at which shareholders of the company will be asked to ratify the plans of directors for the wiping out of dividend arrears on the preferred stock. The unpaid dividends on the preferred shares of the company will amount on March 31 next to $30.50 per preferred share outstanding.

The following compromise is now proposed: (a) Cash dividend of $2.00; and (b) One-eighth of a fully paid preference share and one fully paid common share of the capital stock of the company.

In this connection it is to be noted that all outstanding first mortgage twenty year 6½ per cent bonds due 1947 of Georgetown Coated Paper Mills, Ltd., subsidiary of Alliance Paper Mills, Ltd., which is controlled by Howard Smith Paper Mills, Ltd., have been called for redemption at 102 and accrued interest on February 1, 1936.

This represents another step in the process of simplification of the financial structure of the Howard Smith group of companies. The first mortgage 7½ per cent bonds of another Alliance Paper subsidiary, Lincoln Pulp and Paper, were recently also called for redemption on February 1.

Newsprint Securities in Demand

Notable strength and activity in the bonds and shares of newsprint companies on the Montreal Stock Exchange has attracted attention here. For some time now issues from this group, and particularly the senior issues, have enjoyed a wide demand that has been apparently inspired by the statistical improvement in the industry, as attested by the fact that during 1935 production of newsprint paper by mills in Canada set all-time record and are currently operating at 80 per cent of capacity.

Newsprint Industry Helps Power Output

The marked activity in newsprint production is described as a Godsend to the hydro-electric industry in Canada, and has helped considerably in carrying the output to record heights during recent months.

Meanwhile, capacity in Canada has been increased during the past twelve months by 362,080 hp., bringing the total for the Dominion at the end of the year to 7,909,115 hp.

While the increase in generating capacity is noteworthy, of greater significance is the continued growth in power demand that has taken place during 1935. This is reflected by the monthly records compiled by the Dominion Bureau of Statistics which show a substantial increase in the output of central electric stations month by month over the figures for the corresponding months of 1934. For the nine months of 1935 for which records have been compiled there has been a total increase of more than eleven per cent. This increase in power output has not been confined to any one part of the Dominion but is evident from coast to coast.

The new installations in 1935 comprised, chiefly, additions to existing developments such as the Canyon plant of the Ontario Government on the Abitibi river and the Beauharnois plant of the Beauharnois Light, Heat and Power Company on the St. Lawrence. Increased activity in the mining industry was responsible for new installations in the Yukon Territory and in British Columbia, Manitoba and Ontario.

H. A. Casey Goes with Collins Mfg. Co.

Collins Manufacturing Company of North Wilbraham, Mass., makers of superior high grade rag content Bonds, Ledgers and Index Bristols, announces that Howard A. Casey, formerly sales solicitor of the Hampshire Paper Company, is now associated with Collins Manufacturing Company.

Mr. Casey enjoys a splendid reputation in the paper industry, together with a training and background that eminently fits him for work with the Collins Manufacturing Company.

Mr. Casey served with the Chemical Paper Company and Crocker-McElwain Company for a period of thirteen years, and later with the Hampshire Paper Company for a period of ten years.

Fox River Valley Paper Mills Show Gains

Reports Show Earnings for 1935 Generally Averaged Increase of Approximately 10 Per Cent Over Preceding Year—One Paper Mill Registered 16 Per Cent Increase—Executives Anticipate Further Uptrend In Current Year

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., January 6, 1936—In a summary of the last year for the paper mills of the Fox River Valley, it is evident that gains over 1934 were recorded by practically every industry. While a few instances were found where substantial gains in 1934 were not exceeded in 1935, reports generally averaged a volume increase of ten per cent or better. One mill had a 16 per cent gain. In most instances, pay rolls also showed increases although, there was not such a marked gain in the number of persons employed. This comes about partly through the lengthening of working schedules from the six-hour shift under NRA to the eight-hour shift.

Sales were up 10 to 15 per cent in wire plants, and the machine industries also showed notable progress. One industry recorded a 40 per cent gain in 1935 over the year 1934. Converting and specialty plants likewise showed increased sales and production volume.

While estimates for 1936 are conservatively expressed, almost every executive feels there will be a further uptrend, and some anticipate as great an increase as 1935 showed over the year 1934.

Outlook for Ahdawagam Bright

Anticipations of the Ahdawagam Paper Products Company, Wisconsin Rapids, Wis., are that the new year will undoubtedly be as good or better than the last two years. The company has enjoyed a brisk business in the fiber and corrugated carton field, and in mill cores, mailing tubes, paper boxes and other specialties.

"Our operations for the year have been running about the same as in 1934," said Frank R. Walsh, vice-president and general manager. "There is very little difference in total tonnage, with a slight increase in the average number of employees and payroll.

"New equipment has been installed during the year and we rebuilt some of the older machines so we are ready to handle any increases there might be in the demand for the class of products we manufacture."

James T. Mader has been elevated to general superintendent in charge of all divisions of operations.

Demand for Equipment Brisk

Nekoosa Foundry and Machine Works, Inc., Nekoosa, Wis., has been especially busy since the middle of the summer, and is now employing more than double the number of men for the last four years.

"The most encouraging sign evidencing the present uptrend of business," says T. W. Olson, vice-president, "is that orders are now coming in from paper mills in all sections of the country." This, he believes, indicates that the improvement is not just a local condition.

While production was below normal, the company improved its property and equipment so it is in a position to handle considerably more business.

The most recent addition to the company's line is the Nekoosa uniform chip cutter. Sales have been unusually good during the last year, with installations in representative mills in many cities. A substantial demand is expected this year. Successful experiments have also been made with other new devices to be offered the trade in the near future. The company has also enjoyed a substantial business in iron, brass and sulphite bronze castings.

Rare Books for Paper Chemistry Institute

Two unusual volumes have been added to the library of the Institute of Paper Chemistry, Appleton, Wis. Both are full folio size, on the finest of hand-made papers, with copious illustrations. One is entitled: "Paper, an Historical Account of Its Making By Hand from the Earliest Times Down to the Present Day." It is a limited edition of 250 copies by R. H. Claperton, B. A., Oxford, and was printed by the Shakespeare Head Press. The paper was made by Portals, Ltd., an old English firm. The other volume is "Watermarks in Paper in Holland, England, France, etc., in the Seventeenth and Eighteenth Centuries and Their Interconnection." It is written by W. A. Churchill, and was published by Menno Hertzberger & Co., Amsterdam.

News of the Industry

Earl W. Tinker of Milwaukee, regional U. S. forester for the Lake States area for the last seven years, has left for Washington, D. C. to begin his new duties as assistant chief forester. He conducted a three-day conference on forestry problems for forestry supervisors of the district before departure, and was the guest of honor at a luncheon given by them and the Milwaukee staff at Hotel Pfister, Milwaukee. When Mr. Tinker took charge of the district, there were three forest units totalling 1,200,000 acres. The district now includes nine states, with 15 forest units totalling 15,000,000 acres. The original staff of 11 now numbers 235 persons. The successor to Mr. Tinker has not been named as yet.

Commodore Thomas, superintendent of the Park mill of the Marinette and Menominee Paper Company, Marinette, Wis., has resigned. He and Mrs. Thomas will spend several months traveling in the south and west before making any plans for the future. Mr. Thomas has been with the company for the last four years. His successor has not yet been announced.

City officials of Appleton, Wis., are planning to give a dinner January 18, in honor of Adam C. Remley, who resigned recently as a member of the municipal water commission after serving for seventeen years. Mr. Remley recently resigned as vice-president and general manager of the Patten Paper Company, Ltd., Appleton, Wis., and now is an assistant manager of the Nekoosa-Edwards Paper Company, Port Edwards, Wis., and resides at Wisconsin Rapids, Wis.

R. H. Purdy, general manager of the Tuttle Press Company, Appleton, Wis., has been elected a director of the Appleton Chamber of Commerce. He succeeds J. N. Fisher, president of the J. N. Fisher Lumber Company, who resigned upon removal to Wabeno, Wis. Mr. Purdy has been active in affairs of the Chamber for the last fifteen years.

Three weddings of interest were announced within the last week. Frank J. Harwood, president and general manager of Appleton Woolen Mills, Appleton, Wis., and Miss Elizabeth VanPatten of Burlington, Va., were married New Year's day at Appleton. They are on a trip to Biloxi, Miss.

Paper Industry Outlook Favorable in Boston

While Trading Is Only Moderately Active At Present, Due to the Inventory Period, Paper Manufacturers Continue to Express Optimism—Practically All Grades of Fine, Coarse and Fancy Papers and Paper Specialties Display Strength

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., January 6, 1936—It has been a rather quiet period in the wholesale paper market for the last week or so, due largely to the inventory season, but the outlook appears favorable in all lines, fine, wrapping and fancy papers and specialties. At the office of a prominent manufacturer, an optimistic opinion was expressed. A general complaint is that of low prices, particularly from the manufacturers' standpoint, and possibly to a certain extent from the jobbers.

The paper stock market has also been quiet. Dealers are trying to make contracts for the coming year. Prices were fairly firm, with no material change in values of old papers, bagging, new and old domestic rags or foreign rags. The prospect favors a "pretty good demand."

News of the Industry

Arrangements have been made with the Continental Paper and Bag Corporation, 220 East 42nd street, New York City, whereby the sale of their products in the New England territory, heretofore carried on by W. H. Claflin and Co., Inc., 340 Summer street, Boston, will be conducted by the Continental Paper and Bag Corporation, under the direction of Jesse G. Swift as district sales manager, with offices located at 211 Congress street, this city. The readjustment, effective as of January 1, 1936, includes the direct invoicing by Continental Paper and Bag Corporation of all shipments on and after the above date. All existing commitments to customers of W. H. Claflin and Co., Inc., will be taken over by the Continental Paper and Bag Corporation and all invoices and papers will run in the name of the Continental Paper and Bag Corporation. The new sales organization set-up will in no way change the present personnel, as the same sales representatives will continue to cooperate with customers, according to an announcement.

The plant of Abrasive Products, Inc., manufacturers of coated abrasive papers and cloths, has been removed from Mattapan, Boston, to the former buildings of the Rice and Hutchins shoe manufacturers, South Braintree, Mass. These buildings, three of them, are divided to take of (1) the preparation of abrasives, (2) coatings and finishing, and (3) the stores of raw materials, finished products and supplies. There are 200,000 square feet of floor space. Fine quality abrasive papers and cloths are made in the plant for use in the production of wood and wood products, leather and shoes, machine shops, metal working trades and other industries. Among the products manufactured at the plant is Jewelite, a quick-cutting smooth-finishing abrasive for leather working. The concern was established seven years ago in Mattapan, one of the "depression babies," first employing about 25. The company has today a market for its products all over the world and employs about 90 skilled workers. According to Donald Sabean, treasurer, the sales of this company have increased every year since establishment. R. G. Balcom is president in charge of sales and Charles Oswald vice-president in charge of production.

John E. Brooks, of the Brooks Manufacturing Company, paper dealers, has been re-elected president of The New England Travelers Club, a stationers' organization. James R. Armington, formerly sales manager of the Dennison Manufacturing Company, Framingham, Mass., has been elected first vice-president and Frank N. Fisher, of the Standard Diary Company, second vice-president.

The Tilestone & Hollingsworth Calendar has appeared, and, as usual, is a work of art.

Miami Valley Paper Men Optimistic

DAYTON, Ohio, January 6, 1936—Optimism prevails throughout the Miami Valley with respect to the improvement in trade conditions during the year which has started so auspiciously. The paper industry, being one of the most important in the valley, naturally will enjoy its share of the expected increased volume.

E. T. Gardner, of this city, president of the Gardner-Richardson Paper Company with plants in Middletown and Lockland, stated that business in 1935 "was good, and we are very optimistic as to prospects for 1936. While slight increases were seen in prices, they did not hold their own, but in volume of business we recorded a 10 per cent increase."

The confidence of Mr. Gardner and his firm in the future is shown by the fact that plans are virtually completed for the erection, in the near future, of a $50,000 addition to the company's office buildings on Charles street, Middletown.

Z. W. Ramck, president of the Crystal Tissue Company, reported an increase of tonnage during 1935 of 23 per cent, and predicted that 1936 will show a probable increase of 10 per cent over this volume. "This has been accomplished despite the disturbing influences that have come from Washington during the year just passed," he commented.

G. R. Braun, secretary of the Miami Valley Shippers' Association, which includes 23 affiliated paper-making firms shipping by less than carload lots through the organization, stated that business improved 40 per cent, and that "the year 1936 will do even more for us."

Buys Package Paper Co.

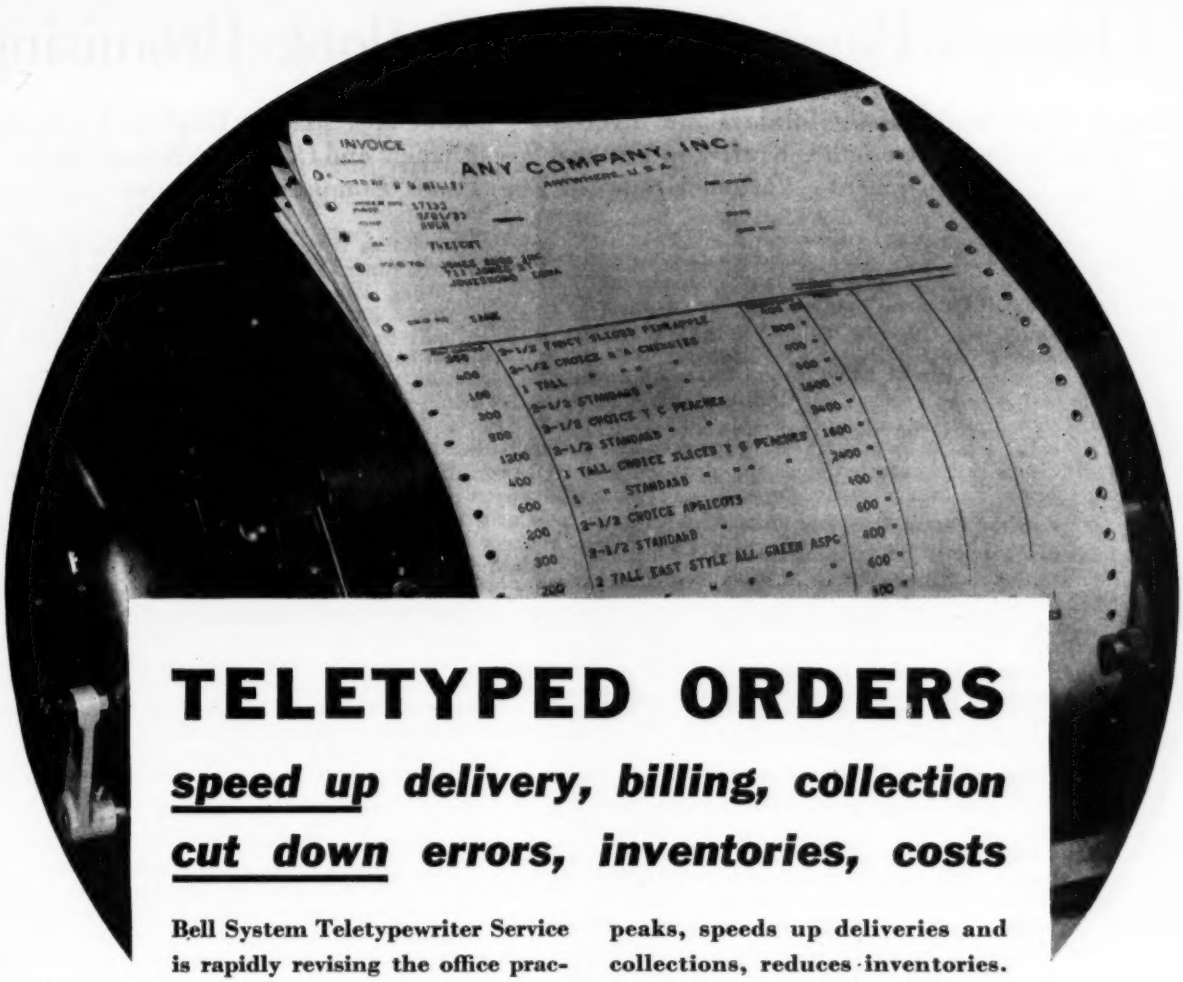
The Nashua Gummed and Coated Paper Company of Nashua, N. H., has purchased the business of the Package Paper Company, manufacturers of printed transparent cellulose, waxed, glassine and specialty papers, located in Holyoke, Mass.

Though no final decision has been reached it is understood for the time being the Nashua Company will operate the Holyoke plant.

Arthur E. Havemeyer, president of the Package Paper Company, has become associated with the Nashua Company in an executive capacity.

The addition of printed transparent cellulose and other specialties to its already established lines of box covering papers, gummed and waxed papers gives the Nashua Gummed and Coated Paper Company an exceptionally complete variety of packaging product.

The Nashua Gummed and Coated Paper Company owns and controls the Nashua Package Sealing Company, the Nashua Sure-Hold Company, the Canadian-Nashua Paper Company and has a controlling interest in the Canadian Sealright Company.



TELETYPED ORDERS

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cut down errors, inventories, costs

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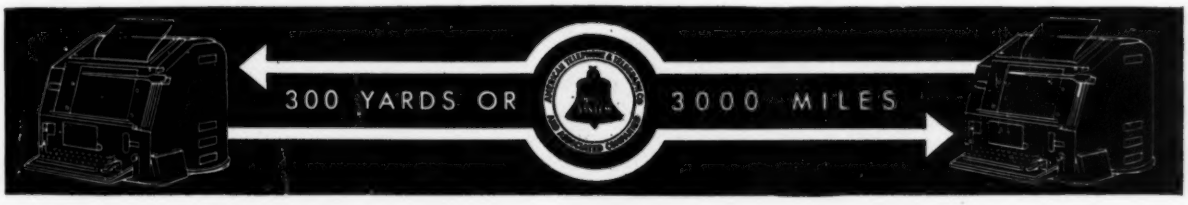
Fast, smooth order-handling levels off production and shipping peaks, speeds up deliveries and collections, reduces inventories. All necessary forms are prepared simultaneously at the separate offices in a single operation—which saves errors, recopying, rechecking, and frees clerical personnel for other duties.

Big and little businesses have proved that teletypewriter service more than pays for itself. Your local Bell Company will be glad to discuss its possible application to *your* business. Just call the Business Office. No obligation, of course.



Chicago Paper Industry Outlook Promising

Despite Usual Lull Due to Holidays and Inventories Local Paper Market Displays Evidence of Fundamental Strength—Kraft and Ground Wood Papers and Container Boards Show Improvement—Various Grades of Fine Paper Comparatively Quiet

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., January 6, 1936.—Although handicapped by the short week Chicago paper merchants and sales representatives found sufficient optimistic comment in the local press and in their own observations to provide cause for a Happy New Year. Still slowed down by a continuation of inventory period, most of the Chicago markets opened the year with an evidence of fundamental strength most noticeable in krafts, container boards and ground woods. In each of these three markets higher production records are confidently expected and an expanded demand together with a firm price structure.

Fine Papers Slow But Firm

Most of the fine paper grades were finding the demand comparatively dull but the markets firm in response to general business improvement, continued evidences of inflationary tendencies and improved conditions within the industry. Bonds and ledgers were reported as in this category. Books and covers moved more slowly with their best months likely not to be in evidence for a few months longer. Waste papers moved slowly but with improvement noted in fundamental market strength.

Paper Merchants Group Formed

Twenty-five leading Chicago paper merchants are starting the new year in a cooperative effort that bids fair not only to iron out several present problems but also to pave the way for future coordinated disposal of trade perplexities. These twenty-five firms banded together, shortly before the holidays, in a six sided agreement with the Chicago Graphic Arts Federation and the Lithographer Manufacturers Association which includes cohesive efforts to solve a series of problems ranging from direct selling to the ever difficult 3 per cent Retailers Occupation Tax.

One of the six points in the agreement calls for a combined campaign of education in the trade to bring about city wide observance of the other five points, which involve efforts at the building up of a permanent arbitration program; sales of plain paper; sales to ordinary customers and sales to large consumers.

The twenty five paper merchants have defined "large consumers" as those buying in mill shipment quantities who, it is reportedly agreed, are entitled to purchase direct from paper merchants. Ordinary consumers, those buying in less than the above described lots, are not to be sold by the paper merchants direct, a situation which also covers the use of paper bought for use on commercial printing equipment.

As far as the sales tax is concerned, the group will endeavor to stop efforts to get printing buyers to purchase paper direct for the purpose of saving the 3 per cent Retailers Occupation Tax.

Included in those in the agreement are Berkshire Papers; Bermingham & Prosser; Bradner Smith & Co.; J. W. Butler Paper Company; Blundon-Lyon Company; Dwight Bros. Paper Company; Fort Dearborn Paper Company; Empire Paper Company; Chicago Paper Company; Messinger Paper Company; W. E. Wroe & Co.; Graham Paper Company; Hobart Paper Company; Marquette Paper Company; Great Lakes Paper Company; LaSalle Paper Company; Hobart Paper Company; James White Paper Company; Midland Paper Company; Parker, Thomas & Tucker; Moser Paper Company; Murnane Paper Company; Swigart Paper Company; Tattershalls; Sabin Robbins Paper Company; Whitaker Paper Company.

Paper Salesmen Hold Party

Close to one hundred paper salesmen and guests enjoyed the annual Yuletide party staged by the Mid West Division of the Salesmen's Association of the Paper Industry, held at the Hotel La Salle on December 27. The eighteenth floor of the hotel was crowded with representatives of the paper industry who enjoyed a buffet luncheon and an interesting program arranged by Ben Babbitt, chairman of the affair. The outstanding entertainment was furnished by a piano duo who operated the two grand pianos with great gusto and perfection. One of the duo, Harold Pfister, is a sales representative of Bradner Smith & Co., while the other, Robert Bridges, is employed by Halsey, Stuart & Co. A great deal of spontaneous singing rounded out a perfect afternoon with J. H. Coy, Sr., again being pressed into service as a perfect singing master.

News of the Industry

William Bond Wheelwright, editor and publisher of *Paper and Printing Digest,* has provided a "Christmas Keepsake" for the local trade in the form of an issue devoted to the use and need of color in modern day industrial, commercial and individual development. He has also provided some interesting comment on "Devices of Ancient Printers" and a series of historical pictures and legends, in color, through the courtesy of the Kimberly-Clark Company.

Local paper executives were interested in this week's report that the River Plate and Brazil Conference had issued 1936 contract rates on toilet paper, paper towels and tissue towels which has changed the rate basis from weight or measurement to a straight weight basis. Under this new arrangement the contract rate to Rio de Janeiro, Santos, Montevideo and Buenos Aires for "B" services is to be $22.50, to Para $24.50, to Pernambuco $25.50 and to Rosario, $26.00.

The Central Freight Association at its January meeting is reported to have considered a proposal for establishment of an ex-lake rate on woodpulp from Muskegon to Niles, Michigan of 6 cents per 100 pounds. The present rate is 15 cents. A report recommending approval of the projected proposal has been rendered.

Satisfactorily purged of an over emphasis on advertising comment, the December issue of the *Friendly Adventurer,* published by Bermingham & Prosser, makes its appearance as a combined Yuletide greeting and interesting bit of comment picked up throughout the world. Silver ink illustrations help to make the issue attractive, while a "Pledge for Printers" on the inside back cover will probably get plenty of circulation in that allied trade. The only advertising appears on the fourth cover where Peacock Folding Enamel gets a deserved break for being a means of getting the Adventurer published.

Reports on Pulp Investigation

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., January 8, 1936—The United States Tariff Commission, in its annual report to Congress, has the following to say in connection with its wood pulp and pulpwood investigation:

In response to Senate Resolution, the Commission instituted, under its general powers, investigations of wood pulp and pulpwood.

Wood pulp and pulpwood are free of duty under the Tariff Act of 1930, and under the terms of the trade agreements with Sweden and Canada they are bound on the free list for the duration of the agreements. The Senate requested the Commission to cover all facts relating to foreign and domestic wood pulp and pulpwood, the causes and effects of foreign competition, and all other factors affecting competition in United States markets.

The investigations are among the largest the Commission has undertaken in recent years. As a result of the broad scope of the information asked for by the Senate, the Commission has found it necessary to make a detailed study not only of the production, imports, prices and marketing of wood pulp in the United States, but also of the costs of production of the principal types of pulp produced in the United States as compared with the price of the imported pulp both from European countries and from Canada.

Concurrently with the study of pulp, detailed data are being obtained with respect to pulpwood, the raw material for the production of wood pulp, which constitutes a large part of the total cost of pulp. The inquiry in regard to pulpwood calls for information on the availability of timber suitable for pulpwood, its cost, transportation, utilization and the competitive situation as affected by species and as between domestic and imported wood. There are several kinds of wood pulp, and the different kinds originate in different localities both in the United States and abroad.

The most important kind of wood pulp, in quantity consumed and still more from the point of view of foreign competition, is sulphite pulp made by a chemical process from chipped wood. This pulp is used largely in producing high-grade papers and in improving the quality of newsprint paper. In 1934, out of a total domestic consumption of about 2,546,000 tons of sulphite pulp, approximately 58 per cent was produced in the United States and about 42 per cent was imported, principally from the Baltic countries, but to a considerable extent from Canada. The next important kind of pulp from the point of view of quantity consumed is sulphate pulp, which is used largely in the manufacture of wrapping paper. Out of a total domestic consumption of about 1,790,000 tons in 1934, approximately 70 per cent was produced domestically and about 30 per cent was imported. The imports of sulphate pulp come largely from Sweden. Mechanically-ground wood pulp, used largely in the production of newsprint paper, is another large item of domestic consumption. Of the total domestic consumption in 1934 of 1,490,000 tons, approximately 87 per cent was of domestic production and 13 per cent was imported. Imports come principally from Canada.

The production of the various kinds of pulp in the United States varies greatly with localities. Sulphite pulp is produced in the Northeastern States and as far west as Minnesota and Wisconsin and in recent years, to a large extent, in the Pacific Coast States.

Mechanically-ground wood pulp is produced principally in the Northeastern and Lake States but there is also a large production on the Pacific Coast. The production of sulphate pulp is widely distributed, but the principal areas of production, in the order named, are the Southern States, the Lake States, the Pacific Coast States and the Middle Atlantic States. In addition to the pulps named above, soda pulp, used largely in making book and writing papers, is a product of considerable importance in the Northeastern and Middle Atlantic States.

The competitive conditions, therefore, both as between domestic production and imports and as among domestic areas, are quite different for the several kinds of pulp. The older producing areas of the Northeastern and Lake States are now feeling severe competition not only from imported sulphite pulp, but also from the pulp produced in the heavy timber areas of the Pacific Coast, where the output is increasing rapidly year by year. There are also strong cross-currents of competition as between the integrated pulp-paper mills (wherein the paper mills obtain most of their supplies of pulp from their own affiliated pulp mills) and the nonintegrated paper mills which purchase either domestic or imported pulp.

Transportation plays a large part in the pulp competition, the product being bulky and comparatively cheap in relation to its volume.

The Commission's investigations cover not only the data of pulp mills but also data regarding consumption and prices of the various kinds of pulp used by the paper and board mills. Costs of production by kinds of pulp will be obtained for representative mills in each of the producing areas of the United States, including the Pacific Coast. A careful analysis of invoices, sales prices, and distribution of the imported pulp will be made.

Although the Commission now has in the field a large crew making these investigations, it will be several months before the information can be obtained, tabulated and summarized.

Nippon Rayon Pulp Co. Starts

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., January 8, 1936—Operations have been started by the Nippon Rayon Pulp Company on a scale of 30,000 tons per year. At their shareholders meeting held on July 13, it was decided to increase their capital from the present paid up amount of 10,000,000 yen to 20,000,000 yen. This company is installing new machines for kraft paper production, with an initial productive capacity of 1,850 tons per month. Operations will begin in April.

Two new paper machines with a width of 120 inches are being installed by Taiwan Kogyo K. K., which will manufacture printing paper from the miscanthus. Two machines of this company with a width of 86 inches went into production in September.

Duro Brace Texsteel Sheaves

The Allis-Chalmers Manufacturing Company, Milwaukee, Wisc., has issued a revised 16-page Bulletin 2188A to include its complete recently-extended line of Duro Brace Texsteel Sheaves for stock drives up to 15 horse power. The bulletin includes dimension tables of all the sheaves, complete horse power and center distance tables for all recommended stock speed ratios, as well as price list tables of these 2 to 6 groove sheaves and for various standard lengths of texrope belts.

Tentative Annual Meeting Program of TAPPI February 17-20, 1936

The annual meeting of the Technical Association of the Pulp and Paper Industry will be held at the Waldorf-Astoria Hotel, New York, February 17-20, 1936.

The tentative program of papers to be presented is as follows:

Heat and Power Engineering: Power Requirements in the Paper Mill, by H. W. Rogers; Rate of Drying Writing Paper, by F. W. Adams; Drying Rates for Glassine and Greaseproof Paper, by V. F. Waters; Drying Rates for Tissue and Absorbent Papers, by A. E. Montgomery; Heat Recovery in the Alkaline Pulping Processes; Diesel Engines as Applicable to the Paper Industry, by M. J. Reed; Boiler Feed Water Treatment, by E. W. Butzler; Mechanism of Electrical Design, by C. J. Koch.

Materials of Construction: Cast Ferrous Alloys, by F. L. La Que; Non-Ferrous Alloys, by J. T. Kemp; Steam Pipe Insulation, by J. W. Hemphill.

Paper Coating: Offset Lithography on Coated Paper, by R. E. Reed; Using a Pebble Mill, by S. J. Dickhaut.

Sulphite Pulping: A Survey of Pitch Troubles in the Manufacture and Use of Sulphite Pulp, by Otto Kress and L. A. Moss.

Bleaching: The Mechanism of Bleaching, by F. E. Brauns.

Management: The Paper Industry and the Business Cycle, by L. T. Stevenson.

Stuff Preparation: The Thorsen-Hery Beater, by G. W. Dodge; Waste Paper Stock Preparation, by Edwin Cowles; The Refining Action of Discs, by D. M. Sutherland, Jr.

Mechanical Pulping: Effect of High Pit Temperature and Preheating of the Wood on the Grinding of Loblolly Pine, by J. C. Pew and R. G. Knechtze; Occurrence of Compression Wood in Black Spruce and Its Effect on the Properties of Groundwood Pulp, by M. Y. Pillow, E. R. Schafer and J. C. Pew.

Laminating of Board: Combining Problem, by W. T. Marble.

Pigments: The Retention of Pigments in Paper, by F. A. Steele and J. H. Haslam; Effect of Beating and Pigmentation on Sheet Properties, by W. R. Willets.

Alkaline Pulping: A Method of Predicting Yields in the Soda Process, by D. W. McCready and W. J. Nolan; Application of the Cottrell Electrical Precipitation Processes to the Recovery of Dust in Stack Gases from Recovery Plants, by N. W. Sultzer and G. Beaver.

Forestry: A Comparison of the Rate of Growth of Pacific Coast Wood and Southern Pine, by David Hervey.

Pulp Testing: Further Experiments with the Kollergang Beater, by J. d'A. Clark; Some Factors Influencing the Sampling of Pulp Shipment for Moisture, by F. W. Brainerd; Pulp Testing, by a Rapid Sheet Making Process, by James Coghill; A Universal Hydrogen-Ion Indicator, by D. T. Jarben and J. L. Parsons.

Paper Testing: Water Vapor Permeability, by Allen Abrams and E. S. Worth; Grease Resistance of Paper, by H. L. Mellen; Chemical Testing Methods, by P. F. Wehmer; Physical Testing Methods, by R. C. Griffin; Some Observations on Burst, Tensile and Stretch Tests, by J. d'A. Clark; Water Resistance of Paper, by P. W. Codwise; The Nature and Measurement of Paper Acidity, by B. L. Browning and R. W. K. Ulm.

Fundamental Research: Preliminary Report on the Existence and Nature of Pulp Membranes, by H. F. Lewis; Preparation and Constitution of Lignin, by W. M. Fuchs.

There will also be a number of reports by committees on projects under way and completed.

The annual luncheon of the Association will be held on Thursday, February 20, 1936. Announcement will shortly be made concerning the speaker.

Crane Co. Establishes New Division

In order to maintain and enhance progress in its diversified fields, and to foster the invention of new products, Crane Company has established a division of research and development. The importance and volume of research and development work warrants the constant full time effort of a group of technical specialists entirely divorced from routine production. They will devote their entire time to a study of the requirements of the trade; with freedom to pursue the research designing and experimental work necessary to improve existing products, and to develop original designs and materials for new products. The research and development work formerly handled by various departments and subsidiaries will be expanded and centralized in the new division, which will be responsible directly to the president, with the vice-president of manufacture and the vice-president of sales acting in a coordinating capacity.

The character of work covered by the new division is indicated by some of the units which it comprises. There will be one for field research, separate units for research and development on industrial products, plumbing products, and heating products. Separate laboratories for research testing and metallurgical research. One unit will be devoted to standardization programs, and another to patents and inventions.

M. W. Link will head the new division, with the title of director of research and development. His assistant will be B. A. Parks. Specialized work will be under the charge of A. M. Houser, engineer of standardization, C. A. Olson, research engineer, industrial and heating products, R. H. Zinkil, research engineer, plumbing products, J. P. Magos, testing engineer, research testing laboratories, and J. O. Lange, engineer of patents.

Announcement is also made of the creation of a new product engineering department at the Chicago works, under the jurisdiction of the vice-president of manufacture. The initial personnel will be C. A. Dopp, product engineer, A. M. Houser, Jr., assistant product engineer, and C. F. G. Neuhaus, drafting supervisor.

There will be close association between the division of research and development and the product engineering department, so that the latter may place in proper production the products or improvements in existing products developed by the division of research and development.

Reconveys Assets To United Paperboard

Vice-Chancellor Henry T. Kays of New Jersey has signed an order reconveying to the United Paperboard Company the assets of that company, finding that debtors have been paid or provided for. The order was effective December 28. The company went into receivership in 1932.

Paper Awards by Government Printing Office

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., January 8, 1936—The Government Printing Office has announced paper awards as follows:

The R. P. Andrews Paper Company and the J. W. Butler Paper Company have been awarded equal amounts for furnishing 200,000 pounds of M. F. book paper in 38-inch rolls at 4.93 cents per pound. The Whitaker Paper Company will furnish 500 pounds of specially-treated tympan paper 48 inches wide at 16.5 cents per pound. Walker Goulard Plehn Company will furnish 5,000 pounds of 25 per cent rag white ledger paper at 8.31 cents and Barton, Duer & Koch Paper Company will furnish 20,100 pounds same at 9.16 cents. The same firm will also furnish 10,000 pounds of 50 per cent rag index, yellow at 9.37 cents while 5,000 pounds of green same will be furnished by Walker, Goulard Plehn Company, at 9.38 cents. Bids for these items were received on December 18.

Barton, Duer & Koch Paper Company will furnish 61,000 pounds of 25 per cent rag, white bond paper, 28 x 34, at 7.91 cents per pound. The Watervliet Paper Company will furnish 30,000 pounds of buff and pink mimeograph paper at 5.68 cents per pound. The Paper Corporation of the United States will furnish 46,750 pounds of 25 per cent rag, white bond paper, 32 x 42, at 8.68 cents per pound and the R. P. Andrews Paper Company will furnish 143,500 pounds of 25 per cent rag, same at 7.53 cents per pound. An award for 115,000 pounds of 32 x 42 white sulphite writing paper was divided equally between John F. Post and the Paper Corporation of the United States at 5.57 cents per pounds. Reese & Reese will furnish 28,000 pounds of 22½ x 28½ jute tag board at 6.86 cents per pound. The Barton, Duer & Koch Paper Company will furnish 20,000 pounds of 50 per cent rag, 21 x 32, white ledger paper at 9.19 cents per pound and 20,400 pounds of 2 per cent rag, yellow bond paper will be furnished by the Whitaker Paper Company at 7.95 per pound. The Graham Paper Company will furnish 35,000 pounds of No. 2 kraft wrapping paper in various size rolls at 3.79 cents per pound. Bids for all of these items were received on December 16.

The R. P. Andrews Paper Company will furnish 34,500 pounds of 32 x 42 white sulphite writing paper at 5.57 cents per pound. The Cauthorne Paper Company will furnish 74,700 pounds of buff sulphite writing paper at 6.54 cents per pound. The Whiting Paper Company will furnish 40,005 pounds of pink, salmon and white bond paper at 9 cents and 11 cents per pound and the Aetna Paper Company will furnish 15,325 pounds of 25 per cent rag cherry, same at a total of $1,219.87. The Virginia Paper Company will furnish 10,000 pounds of white sulphite ledger paper at 6.54 cents per pound and the same firm will also furnish 33,900 pounds of white sulphite index paper at 6.06 cents per pound. The Old Dominion Paper Company will furnish 16,000 pounds of 25 per cent rag, 19 x 24 white blotting paper at 9.21 cents per pound. Reese & Reese will furnish 17,700 pounds of drumhead manila paper at 14 cents per pound. Bids for these items were received on December 13.

The R. P. Andrews Paper Company will furnish 65,000 pounds of 21 x 23 white sulphite manifold paper at 7.44 cents per pound, bids for which were received on December 11.

The Aetna Paper Company will furnish 33,850 pounds, 25 per cent rag, blue, salmon, and yellow bond paper, at a total of $2,733.86 and Barton, Duer & Koch Paper Company will furnish 5,100 pounds, 50 per cent rag, yellow bond paper at 9.98 cents per pound, bids for which were received on December 9.

The Whitaker Paper Company will furnish 36,000 pounds of wood manila paper at 3.225 cents per pound. Barton, Duer & Koch Paper Company will furnish 20,000 pounds, 50 per cent rag, green, cherry and yellow ledger paper at 9.98 cents per pound, bids for which were received on December 6.

Indianapolis Is Optimistic

[FROM OUR REGULAR CORRESPONDENT]

INDIANAPOLIS, Ind., January 6, 1936—Following a rather dull period around the holidays, the paper trade here rebounded at the end of last week giving the jobbers and manufacturers an optimistic outlook on the first quarter of the new year. It is reported that contracts are coming more easily than they did a year ago, but most of them continue to be for comparatively short periods. It is believed that the day of the long-term contract is rather distant. And this is in spite of the fact, on the whole, prices in all lines are fairly well stabilized, with every indication of higher levels being reached before the winter closes.

Demand for fine papers, including books and covers, continues in fair shape. Quite a bit of direct mail literature is being sent out, and a good percentage of it is being done in an artistic manner with colors and covers of the finest quality. In spite of the lateness of the season, some catalogue work remains to be completed. Local printers and advertising agents report more of this work done this year than last by a good margin.

Box manufacturers, after taking inventory, were planning to step up their production this week. Orders are reported increasing, and with warehouse stocks depleted during the pre-holiday period and production curtailed, it has become necessary to increase hours. A survey of the local plants shows that no wage reductions were made after the abolition of NRA during the summer, and thus far there have been no reductions of any sort. Manufacturers say prices of raw materials have advanced, which accounts for the slight increase in price levels from the same period a year ago. Container factories also are working steadily. Makers of paper board and fiber products say the future is particularly bright.

Jobbers of building papers say last year was the best they have seen since the year of the big fall. Stocks carried over are not heavy, and in view of the bright outlook, jobbers are expecting to get into the market earlier than they have been in the habit of doing.

Foreign Style Papers in Japan

WASHINGTON, D. C., December 31, 1935—Production of foreign style paper in Japan during the month of October declined 1.8 percent and sales declined .4 percent compared with the preceding month, according to reports from Commercial Attache, Frank S. Williams, Tokyo. Imports of wood pulp during the same months amounted to 24,300 short tons, including 14,200 tons of pulp destined for paper mills. Wood pulp imports during October represented an increase of 55 percent over the preceding month, most of which was for paper production. Between 40 and 45 percent of the wood pulp imports were credited as coming from the United States.

Philadelphia Paper Industry News

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., January 6, 1936—The D. L. Ward Company announces that on January 1, 1936, C. A. O'Neill was placed in charge of their Printing Division, and William McDowell was appointed manager of sales. Both of these gentlemen have been with the company over fifteen years.

The Charles Beck Company announce the appointment of Reginald D. Perry, formerly vice-president of the D. L. Ward Company, as general manager, and Calvin Troutman, also of the Ward company, salesman in charge of the Printing Division.

Sylvia Isen, daughter of Nathan D. Isen, president of Enterprise Paper Company, residing at 2222 North 53rd street, will be married to Samuel Stonberg of Wynnfield, at 8:30 o'clock, next Sunday evening in the Adelphia Hotel. Mr. Stonberg is sales manager of Enterprise Paper Company. They will reside in the Wynnfield Apartments on City Line avenue.

Fire shortly after 3 p.m. today, threatened a four-story brick warehouse at 1023-25 Germantown avenue, occupied by Potash Brothers, dealers in rags and waste paper. Two alarms were sounded as it was feared the blaze would spread to neighboring factory buildings. The fire apparently was on the third and fourth floors of the building and gave off dense smoke which covered the district like a blanket and hindered the efforts of the firemen. At the time the fire was discovered, it was said, several employees were on the third floor baling rags and waste paper material. They made their way to the street without danger and assisted the firemen in their efforts.

Philadelphia Paper Trade Optimistic

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., January 6, 1936—The paper trade here is busied with inventory-taking, and the consensus of opinion is that "business this first week of the New Year is definitely upward." Business psychology at this time of year is always cheerful. There is always something intriguing and exhilarating about the thought of a new year. And so, according to reports in this area, it is —but with a difference.

For six long years the expression "A Prosperous and Happy New Year" has been the symbol of a hope rather than the expression of a conviction. This year, it is a conviction. Those in the trade here are unanimous in their opinion that they are headed into a better business era, and already definite progress has been made toward higher levels—all of which has been accomplished in face of the greatest accumulation of uncertainties that marked any one year of the depression. The year just closed marked the peak for prosperity in the paper industry since 1930, and, despite these uncertainties which entered the picture, it provides a real conviction and sincerity to the expression: "A Prosperous and Happy New Year!"

New Silent Steel Gear Folder

The John Waldron Corporation of New Brunswick, N. J., manufacturers of the Waldron Silent Steel Gear, has just issued a new folder which points out the importance of these elements of steel and silence in gear operation. It likewise refers to the Waldron Silent Steel Gear Blanks which are manufactured in various sizes and fixed face widths. A copy of this folder is available to any interested executive.

Grays Harbor Pulp & Paper Co. Expands

ABERDEEN, Wash., January 3, 1936—A $50,000 breakdown and chipping plant will be constructed by the Grays Harbor Pulp and Paper Company as an auxiliary to its big pulp and paper factory in Hoquiam, it was announced today by W. S. Lucey, manager.

Construction is expected to start early in January and the plant completed for operation some time the coming spring. A site immediately west of the paper mill, between the mill and the mouth of the Hoquiam river, already is being prepared. Old piling from the former National mill and debris are being removed, and the land surveyed.

The plant will be housed in a building approximately 150 feet square, and will consist mainly of a "shotgun" feed carriage rig, a nine-foot band mill, a single rip saw and an accompanying chipper plant. A long conveyor will carry the chips along the river face of the present mill to the starting point of the paper-making process on the east side of the plant.

Mr. Lucey asserted that the new unit will be used primarily to "break down" small hemlock logs for cleaning and chipping. Full-length logs will be hauled from the water on an ordinary log slip and then bucked into 20-foot lengths for the rig, which will have only a 20-foot travel. All told the new unit is expected to employ about 25 men.

The new plant, Mr. Lucey announced, is being built to augment the chip supply and insure a constant flow of raw material for the big pulp and paper unit. The present central chipping plant, through which all the cord wood passes, and the chippers at the Polson Lumber and Shingle and Schafer mills will operate as they have in the past, he said.

Included in construction operations will be a 16,000-yard dredging job for the slip and log boom.

Testing by the National Bureau of Standards

Judging from the continuous flow of requests for the routine testing of materials received by the Bureau of Standards, at Washington, D. C., its policy respecting testing is not generally known. While the bureau does a vast amount of testing, it is largely confined to test data required in research work and the testing of supplies received by the Government Department. It is contrary to the policy of the bureau to compete with private enterprise, therefore it does not engage in tests for the public which can be satisfactorily made by commercial testing laboratories. General information on the commercial testing services available is contained in the Bureau "Dictionary of Commercial Testing and College Research Laboratories," and further information on the testing of specific materials can be obtained from the bureau. Its tests for the public are comprised largely of tests related to the accuracy of methods or instruments, and referee tests.

Achema VIII 1937, Frankfurt a. Main

The "Achema VIII" exhibition of chemical plant, organized by the DECHEMA Deutsche Gesellschaft für chemisches Apparatewesen E. V. (German Chemical Plant Association), will be held in Frankfurt a. Main early in September, 1937, together with the 50th General meeting of the Verein Deutscher Chemiker.

Frankfurt a. Main is not only suitable by reason of its geographical and economic position, but also because it was there that the Verein Deutscher Chemiker was founded in 1887.

CONSTRUCTION NEWS

A Summary of Vital Facts Regarding Construction, Finances and Operation of Paper Mills

Construction News

Watervliet, Mich.—The Watervliet Paper Company is considering construction of new addition to plant, fronting on the Paw Paw River, to be used primarily for storage and distributing service. It will be one-story, reported to cost over $45,000, with equipment. Erection will be placed under way early in the Spring.

St. Louis, Mo.—Following recent purchase of controlling interest in the Sefton National Fibre Can Company, Big Bend boulevard, Maplewood, St. Louis, by the Container Corporation of America, Inc., 111 West Washington street, Chicago, Ill., plans are being arranged for change of name to Sefton National Fibre Company. Acquiring company will continue production at same location for fibre containers of various kinds and will develop large capacity. A. J. Baumgardt, controller of the Container Corporation, will be president of the new subsidiary interest. Arthur H. Grace of Sefton company will continue as vice-president. During the past year, the Container Corporation has expended about $900,000 for plant expansion and improvements, and will carry out maximum production at different mills during 1936. Walter P. Paepcke is president of last noted company.

Hinsdale, N. H.—The Hinsdale Paper Manufacturing Company, manufacturer of tissue paper stocks, etc., proposes call for bids on general contract early in 1936 for rebuilding of mill at Hinsdale, destroyed by fire a number of weeks ago with loss estimated close to $200,000, as previously noted in these colums. New paper-making machinery and auxiliary equipment will be installed. McClintock & Craig, 458 Bridge street, Springfield, Mass., are consulting engineers.

New York, N. Y.—Jay H. Albere, Inc., has been organized with capital of $25,000, to take over and succeed to the business heretofore conducted under name of J. H. Albere, 148 Lafayette street, paper products of various kinds; new company is headed by Jay H. and Edward H. Albere, both 158 Maple street, Brooklyn, N. Y.

Newark, N. J.—The International Ticket Company, 50 Grafton avenue, has acquired adjoining building at 52 Grafton avenue, and will occupy for expansion in paper-converting plant. Improvements will be made in structure.

Grand Rapids, Mich.—The Grand Rapids Fiber Cord Company, operating in portion of former local plant of the Berkey and Gay Furniture Company, is arranging for early establishment of a new department for the manufacture of paper-fiber cord bags and containers. New equipment will be installed in part of present plant. Company is expanding operations in other departments and has more than doubled working force in recent months. Wade E. Sackner is president.

Lee, Mass.—Smith Paper, Inc., has rejected bids recently received on general contract for new additions to plant, recently referred to in these columns, and will have revised plans prepared at once. New bids are expected to be asked soon. Project will include two one-story units, to be equipped for expansion in machine department and finishing division, respectively. Work is reported to cost close to $60,000, including equipment.

Huntington, Ind.—The Huntington Paper Box Corporation, 1345 Henry street, recently organized with capital of $10,000 and 1000 shares of common stock, no par value, will operate a local plant for manufacture of paper boxes and containers, and allied paper products. Donald S. Brown and Raymond A. Woodbeck, 703 First street, Huntington, head of the new organization.

San Francisco, Cal.—The Union Lithograph Company, 735 Harrison street, has awarded general contract to Lindgren & Swinerton, 225 Bush street, for alterations and improvements in paper-converting plant, and will place work under way at once. Leland S. Rosener, 233 Sansome street, San Francisco, is architect and engineer.

New York, N. Y.—The Bloch Brothers Paper Company, Inc., 99 Greene street, paper products of various kinds, has arranged for increase in capital from $30,000 to $250,000, for general expansion.

Monroe, Mich.—T. F. Sullivan, receiver for the Monroe Paper Products Company manufacturer of box board, chip board, panel boards and kindred products, has been released by the Wayne Circuit Court and the receivership terminated. Plant production will be continued at the mill under regular management, headed by A. J. Groesbeck, president. In recent months improvements have been made at the plant, including installation of new equipment, and operations are now on a basis to give employment to close to 275 persons in different departments.

Orange, Tex.—The Equitable Paper Bag Company, Scholes and Meserole streets, Brooklyn, N. Y., is said to have plans completed for alterations and improvements in former mill of Commercial Pulp and Paper Company, Orange, recently acquired for a new plant, as previously noted in these columns, and will proceed with project at early date. Work is reported to cost over $80,000, including equipment. Mill will be operated in the future under name of the Orange Pulp and Paper Company, which will be an affiliated company interest. Mill will be arranged for a production schedule of about 50 tons of kraft paper stock per day. Frederick L. Smith, 21 East Fortieth street, New York, N. Y., is engineer in charge.

Chicago, Ill.—The J. J. Lipp Paper Company, 11 North Green street, paper products, has arranged for increase in capital from 100 to 5000 shares of stock, for general expansion.

Ogdensburg, N. Y.—The Algonquin Paper Corporation, manufacturer of sulphite pulp products, is developing increased production and the mill is scheduled to run on a capacity basis for newsprint manufacture throughout 1936, aggregating about 40,000 tons gross for the twelve

months' period. Employment will be given to a full working force in all departments. Company has closed contracts to insure such operations for the year, expected to be the largest output developed at the plant since the mill was opened 12 years ago. During 1935 the plant produced about 33,000 tons of newsprint. Frank A. Augsbury is president.

New York, N. Y.—The United Paperboard Company, 171 Madison avenue, New York, has been discharged from receivership by the Court of Chancery, New Jersey, Vice-Chancellor Henry T. Kays ordering the reconveying of existing assets to the company, effective December 28. Company is a New Jersey corporation and operates four large mills in Maine, New York and other parts of the country.

Warrington, England—Thames Board Mills, Ltd., **Warrington, Lancashire,** manufacturer of paper board products, cardboard, etc., has plans maturing for a new plant unit on 30-acre tract of land, acquired some time ago. It is proposed to begin work early in 1936. New mill will consist of several one and multi-story units and is estimated to cost over $1,500,000, including machinery. It is planned to place orders for machinery at once.

New Companies

New York, N. Y.—Wilsonite Products, Inc., has been incorporated with a capital of $100,000, to manufacture paper products of special character. New company is represented by Franchot & Warren, 60 East Forty-second street, New York, attorneys.

Boston, Mass.—The Salco Paper Company, Inc., has been formed with capital of 100 shares of stock, no par value, to deal in paper products of various kinds. Joseph Cohen, 9 Nazing street, Roxbury, Boston, is president and treasurer.

New York, N. Y.—Popper-Stein, Inc., has been incorporated with capital of $20,000, to deal in paper and paper products of various kinds. New company is headed by Murray T. Popper, 789 West End avenue, New York; and Clarence Stein, 10 Summit street, Larchmont, N. Y.

H. & J. Shapiro Co. Improve Service

"An army in the field depends considerably for its success upon the invisible army behind the lines. The very many Services that are rendered in carrying out schedules for the delivery of food rations and other supplies are indispensable for the success of the men on the firing line." "Similarly," writes H. & J. Shapiro Co., Inc., 40 West 25th street, New York, N. Y., "are the unseen services that are rendered by the paper merchant indispensable for the conduct of an efficient and progressive business organization.

"To improve and strengthen one phase of this service, namely our delivery service, we have added two new Diamond T motor trucks, each of one and one-half ton rated capacity. These high speed 1936 trucks with specially built bodies to facilitate loading and unloading from either side or the rear, will enable us to better even our present rapid and dependable delivery service. This additional equipment was put into service on December 2nd."

W. H. Cowles Goes with Bulkley, Dunton

Wendell H. Cowles has resigned as sales manager of the W. F. Hall Printing Company to become associated with Bulkley, Dunton and Company. Before joining the Hall organization in 1932, Mr. Cowles was vice-president of the Fitchburg Paper Company.

Production Ratio Report

(These statistics are based upon paper production reports to the American Paper and Pulp Association.)

COMPARATIVE MONTHLY SUMMARIES

1935	Total Production Ratio	1934	Total Production Ratio
January	65.8%	January	.....
February	70.0%	February	.....
March	70.5%	March	.....
April	70.0%	April	.....
May	69.4%	May	.....
June	72.3%	June	.....
July (b)	67.8%	July	.....
August	70.9%	August	.....
September (c)	75.0%	September (c)	59.4%
October	75.6%	October	64.7%
November	75.3%	November	61.7%
December	.....	December (a)	62.1%

COMPARATIVE WEEKLY SUMMARIES

CURRENT WEEKS, 1935		CORRESPONDING WEEKS, 1934	
*December 7	76.1%	December 8	61.2%
*December 14	75.8%	December 15	65.4%
*December 21	78.8%	December 22	65.8%
*December 28 (a)	60.1%	December 29 (a)	54.8%

The following statistics show the number of mills reporting by ratio groups:

	Number of Mills Reporting, Current Weeks			
Ratio Limits	Dec. 7, 1935	Dec. 14, 1935	Dec. 21, 1935	Dec. 28, 1935
0% to 50%	90	84	67	84
51% to 100%	250	249	255	122
Total Mills Reporting	340	333	322	206

* Subject to revision until all reports are received.
These data exclude (a)—Christmas Day, (b)—Fourth of July, (c)—Labor Day.

PAPERBOARD OPERATING RATIOS

According to reports from the National Paperboard Association, per cents of operation, based on "inch-hours," were as follows:

1934		1935		1935		1935	
September	62%	January	61%	May	61%	September	69%
October	63%	February	67%	June	65%	October	76%
November	56%	March	67%	July	59%	November	70%
December (a)	53%	April	61%	August	65%		

Week ending Dec. 7, 1935	67%
Week ending Dec. 14, 1935	66%
Week ending Dec. 21, 1935	70%
Week ending Dec. 28, 1935	37%

TAPPI and Superintendents To Meet

The Kalamazoo Valley Section of the Technical Association of the Pulp and Paper Industry and the Michigan Division of the Superintendents Association will hold a joint "Papermakers Meeting," at the Park-American Hotel, Kalamazoo, Michigan, at 6:30 P. M., Thursday, January 16, 1936.

Ralph A. Hayward, vice-president of the Kalamazoo Vegetable Parchment Company will be the meeting chairman. The speakers will be Jacob Kindleberger, president of the Kalamazoo Vegetable Parchment Company, and C. E. Curran of the Forest Products Laboratory, Madison, Wisc.

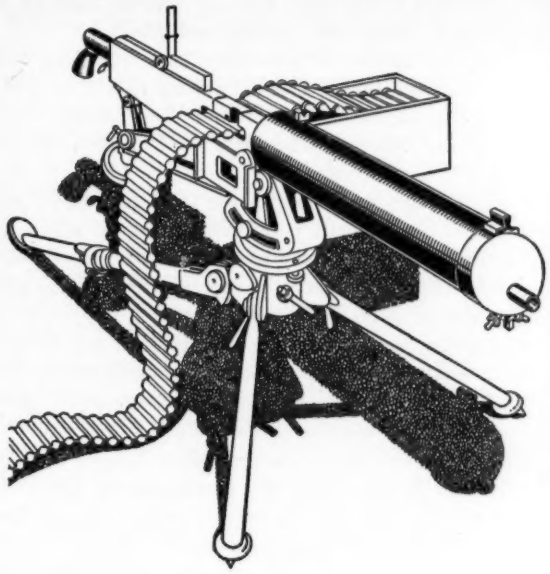
There will also be a musical program.

Plans have been made to entertain more than two hundred foremen, machine operators, beater engineers, executives, buyers, cost and technical men.

Gilman Paper Co. Moves

The Gilman Paper Company, located for the past eight years at 475 Fifth avenue, has leased space, through A. Sheldon Jaffe, broker, for its New York offices on the 14th floor of the International Building, Rockefeller Center, for immediate occupancy.

The company manufactures paper bags, kraft paper and cement sacks. Its manufacturing plant is in Vermont. Isaac Gilman, who founded the business 50 years ago, is president, Charles Gilman vice-president, and E. A. Kendler secretary-treasurer.

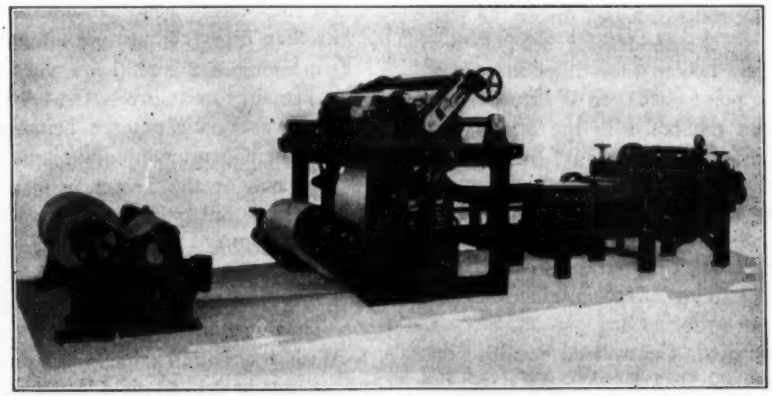


Like a Fine Machine Gun this NEW TUBER

Is Speedier Yet More Accurate

Up to now, a sharp increase in speed meant less accuracy—and vice versa. But just as a machine gun is both speedier and more accurate than a flintlock, so is the new S & W Straight-line Tuber. Speed breaks all previous records (800′ a minute and more). And accuracy is kept strictly to 1/16″ (1/8″ from previously printed rolls). This accuracy is maintained by electric eye control even when rolls are unevenly wound or badly dished.

Here is an opportunity for you to win new business and increase production without increasing your force, space or number of machines in operation. Write for full data and quotations on S & W tubers and bottomers.



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COMING EVENTS IN THE PAPER INDUSTRY

AMERICAN PAPER AND PULP ASSOCIATION, Fifty-Eighth Annual Convention and Meeting, Waldorf-Astoria Hotel, New York, February 17-21.

TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY, Convention, Waldorf-Astoria Hotel, New York, February 17-20. Annual Luncheon, Waldorf-Astoria Hotel, Thursday, February 20.

SALESMEN'S ASSOCIATION OF THE PAPER INDUSTRY, Annual Meeting and Luncheon, Waldorf-Astoria Hotel, New York, Tuesday, February 18.

NEW YORK ASSOCIATION OF DEALERS IN PAPER MILL SUPPLIES, Annual Banquet, Hotel Commodore, New York, February 19.

NATIONAL PAPER TRADE ASSOCIATION OF THE UNITED STATES, Convention, Waldorf-Astoria, New York, February 17-21.

CANADIAN PULP AND PAPER ASSOCIATION AND SECTIONS, Annual Meeting, Montreal, January 29-31.

TECHNICAL SECTION, CANADIAN PULP AND PAPER ASSOCIATION, Annual Meeting, Montreal, January 29-31.

ECONOMIC PITFALLS IN THE FEDERAL SOCIAL SECURITY ACT

By the circumstance of being in the machinery business instead of the motor car industry, a firm may be required to pay nearly twice the pay roll tax levied under the Federal Social Security Act; by the accident of being located in New England it may pay two to four times the tax of a Southern competitor. So point out Allen W. Rucker and N. W. Pickering, business economist in the latest pamphlet issued by Farrel-Birmingham Company, Inc.

Terming the act as either "an unfortunate blend of radical politics and reactionary economics, or a remarkably clever socialistic device for subverting economic freedom while maintaining the pretense of political liberty," the authors draw attention to striking effects produced by the legislation.

Under the subcaption entitled "Centralized Wealth Control?" the fact is emphasized that Section 807-a of the Act requires that proceeds of the pay roll tax collections shall be paid, not as is often supposed, into a special fund, but into the Treasury of the United States as internal revenue.

Thence, *from the Treasury* (Section 201-a) there is to be appropriated to the "Old Age Reserve Account" *only such part of the tax collected* as may be an "amount sufficient as an annual premium to provide for the payments required under this title * * * to be determined upon a reserve basis * * * and upon an interest rate of 3 per centum per annum compounded annually."

Thus, any excess of collections over premium requirements may be used for any purpose to which Congress may care to appropriate the funds, even though American workers and American business paid those funds for a single, specific purpose.

Likewise, any deficiency in the fund (the usual experience with Government enterprises) can be made up by appropriations from the Treasury without the political hazards of directly increasing the pay roll taxes on the salaries and wages of some 30 million citizens.

It is thus evident that the enterprise is not to be conducted under the rigid "make-good" requirements of private insurance companies, but instead may recoup its losses by ready recourse to the public purse.

That, however, is the least fearsome feature of the Act. Section 201-b concerning the investment of funds transferred to the Old Age Reserve Account simply bristles with implications of the gravest nature, thus:

"It shall be the duty of the Secretary of the Treasury to invest such portion of the amounts credited to the Account as is not, in his judgment, required to meet current withdrawals. Such investment may be made *only in interest-bearing obligations* of the United States or in obligations guaranteed * * * by the United States. For such purpose such obligations may be acquired (1) on original issue at par, or (2) by purchase of outstanding obligations *at the market price.* The purpose for which obligations of the United States may be issued under the Second Liberty Loan Act, as amended, are hereby extended to authorize the issuance at par of special obligations, exclusively to the Account. Such special obligations shall bear interest at the rate of 3 per cent per annum. Obligations other than such special obligations may be acquired for the Account only on such terms as to provide an investment yield of not less than 3 per centum per annum."

The meaning of this section is very plain: The Secretary of the Treasury must invest the "Account" funds only in government securities; there being not enough for the purpose, the Government may issue the needed amount at 3 per cent, or the Secretary may go into the market and buy them, but only at a price which will yield 3 per cent per annum.

The possibilities of these provisions must be as thrilling to the originators as they are staggering to industry and labor. They can only be touched upon here:

1. With the nation's banking system overloaded with Governments bought to yield less than 3 per cent, the book value of such assets can be substantially lowered at any time the Treasury cares to bring down the market to a 3 per cent yield in order to acquire U. S. Bonds for the "Account." Under the Act the Treasury may buy outstanding issues but only "on such terms as to provide a yield of not less than 3 per cent." Little wonder that forward-looking banks are heavily increasing the amount of their surpluses, even though a reduction in capital is thereby necessitated.

2. With the "Account" and/or the pay roll tax destined to absorb every year amounts double the normal annual increase in savings banks deposits, and virtually equal to the total annual life insurance premiums, these two major sources of funds for industrial expansion are certain to dwindle to almost the vanishing point. One cannot grasp readily the implications of this situation in their fullest degree. If, however, the nation is now saving to the best of its ability, and those savings are diverted to the United States Treasury, by whom and under what conditions will industrial expansion be financed in the future? And who will dictate industrial policy?

3. With the Government enabled to issue and then "buy its own bonds from itself" what becomes of the *money* collected in pay roll taxes by the Treasury? Under the provisions of Section 807-a and 201-a-b, the Federal Government will in time have and own both the bonds *and* the money! The finite mind finds it difficult to grasp the significance of this situation; the following discussion is merely suggestive.

Under section 807-a pay roll taxes go into the Federal Treasury as internal revenue; under Section 201-a the Treasury transfers the funds to the Old Age Reserve Account as a necessary Federal expense; under Section 201-b the "Account" must buy only U. S. Government obligations. The Government is then empowered to issue 3 per cent bonds especially for the "Account" and thus by process of exchanging bonds for money, bring right back into the Treasury the "savings" of American industry and labor impounded by the pay roll tax. That is point number one.

The second point is: By such means the entire proceeds of pay roll taxes are potentially available for whatever expenditures a spend-thrift Administration may conceive and a willing Congress approve.

The annual amount thus at hand for the Federal expense account will range from one billion dollars in 1937 to almost three billion dollars a year by 1949.

It is no wonder that there has been so little genuine concern about the unbalanced Federal budget and the astronomical proportions of the Federal debt. Pay roll tax collections can be used to bolster up Federal revenues via bond sales to the Old Age Reserve Account while *at the same time* bond purchases of the Old Age Reserve Account can be used to apparently "retire" the Federal debt. The liability represented on the Federal balance sheet by outstanding bonds is cancelled in whole or part by the "assets" of the Old Age Account which belong to the "Government." The Government owns its own debt; hence, it will be argued, there is no debt to be repaid.

The potentialities of such a situation are numbing to the senses. Under the Act it is not only possible but virtually required that the Federal debt be continuously expanding to provide investment for the funds of the "Account." (Sec. 201-b). That means a permanently unretireable debt and a permanent market for Federal bond issues. Industry and labor are compelled to save and then compelled to invest the savings in Government debt which can never be liquidated.

This is the law as prescribed in Section 201-a-b and 807-a of the Federal Social Security Act.

By this compulsory issuance of new debt, by imminent concentration in Federal hands of nine to thirty billion dollars representing almost the total savings of the nation for the next fifteen years, there is brought about a centralization of wealth control, and potential dominance of credit by a bureaucratic government which would make John Law writhe in his grave.

Nor is that more than the beginning. The destructive inequalities of the innocent-looking and apparently equal pay roll tax are equally as formidable.

However praiseworthy the intent of the Act, business cannot afford to be blinded to these facts:

1. It excludes from monthly old age benefits over 40 per cent of employed workers and all persons never employed; it limits benefits in any worth while amount to those who had earnings sufficient to take care of their own old age:

2. It will divert into the Federal Treasury annually sums equal to the total of all life insurance premiums and nearly twice the normal annual increase in savings bank deposits, and

3. It thus delivers into Federal control the bulk of the nation's savings out of which business expansion is ordinarily financed;

4. It compels a constantly expanding Federal debt which can never be liquidated, and requires the Old Age Reserve Fund to surrender the savings of millions to the Federal Government in return for bonds;

5. It will place in the hands of the Secretary of the Treasury a fund estimated at nine billion dollars in 1942 and 30 billions in 1949, power of almost absolute dictatorship over the market value of Government obligations;

6. It imposes a tax, apparently equal, but actually falling up to ten and twelve times as heavily upon some industries as upon others—a fact that forecasts the liquidation of a greater portion of the forty per cent of American corporations which never earn a taxable profit in the most prosperous years. The potential unemployment and insecurity of the unequal tax is appalling.

The pamphlet contains a table showing for nearly all lines of business the amount by which prices must be raised or sales volume increased in order to enable a firm to absorb the pay roll tax.

Newsprint Exports Increase

MONTREAL, Que., January 6, 1936—Canada's newsprint exports in November, amounted to 4,880,747 cwt., valued at $8,230,189, as compared with 4,808,421 cwt., valued at $8,178,485 in October, and 4,431,065 cwt., valued at $7,678,966 in November, 1934. For the eight months of the fiscal year to the end of November the newsprint exports were valued at $59,893,305, as compared with $54,621,556 for the similar period of 1934. Wood pulp exports in November amounted to 1,338,336 cwt., valued at $2,650,697, as compared with 983,664 cwt., valued at $2,127,250 in November, 1934.

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ZINC SULPHIDE PIGMENTS IN PAPER

Section of the
Technical Association of the Pulp and Paper Industry
Edited by Ronald G. Macdonald, Secretary

Catalytic Removal of Iron from Water*

By M. J. Shoemaker[1]

We have all stopped at a cool spring on a hot day and have tasted the sparkling water, and some of you may have believed that you had found at last some pure water. But pure water is practically unknown in nature, and is prepared with difficulty in the laboratory. Being a remarkably good solvent, it is little wonder that water should absorb traces of the earth and the gases with which it has come in contact. It is easily contaminated by the society it keeps. In most materials traces of impurities may be neglected, but not so with water. In fresh water, the presence of a few hundreds of one per cent of dissolved matter may produce effects all out of proportion to its concentration. In industrial processes slight amounts of dissolved materials may spell the difference between failure and success.

Iron, next to aluminum, is the most abundant metal in the earth's crust so that it is usual to find iron in all natural waters, especially ground waters. Iron may enter surface waters from springs or from industrial wastes. Among the worst offenders are pickling wastes from steel mills and drainage from mines.

There are two general iron belts; one occurring irregularly along the Atlantic seaboard; the largest, however, is in the middle west with branches extending into Pennsylvania and as far west as the Dakotas, Wyoming and Oklahoma, and finally there are a number of scattered areas in some parts of Washington, California, Utah, Arizona and New Mexico.

When water contains considerable iron at the source of the supply it does not necessarily follow that there will be an undesirably high concentration by the time it reaches the point where it is to be used. Iron may precipitate in the pipe line. If it does precipitate one of three things may happen to it. The precipitate may stay in suspension and result in what is termed "red water." This is especially apt to happen in hot water systems. Again, with .3 parts bacteria known as crenothrix may develop. Crenothrix build the iron into spongy organic growths so loosely attached to the sides of the pipes that surges carry them off to cause discolored water. Although these growths are harmless in themselves, they frequently decay and give rise to disagreeable tastes and odors in the water. One way to stop the development of crenothrix is to add a little copper sulphate, about 0.1 p.p.m. to the water at its source. Chlorine also kills the crenothrix. A third thing which may happen to iron while it is being carried through pipes is to deposit rust. The opening in the pipe may be almost closed by the iron oxide which adheres to the walls. As a result, there is a decided pressure drop and carrying capacity is greatly reduced. Eventually it may be necessary to replace the pipe or clean it out. One of the easiest and most effective methods to clean out pipes coated with rust deposits is to treat the inside with a solution of dilute acid and an inhibitor. The inhibitor is usually an organic material which, when present to the extent of a fraction of 1 per cent, has the remarkable property of preventing the acid from appreciably attacking the metal and thereby confining its action to the deposit which lines the pipe. Inhibitors include such materials as formaldehyde, low grade wheat flour, coal tar bases such as pyradine, butylamine and 3-6 dimethyl 1-2-7 diethyldiaminoacridine hydrochlorid, according to Levy[2] is 96.6 per cent efficient in reducing attack on the metal.

The incident of pipe clogging is surprisingly common. It is going on, for example, at a factory in Freeport, a cheese factory at Beaver Dam, and, I understand, in the consumers' lines at Mosinee, Wis. Allen Abrams[3] of the Marathon Paper Mills has had an interesting and successful experience with inhibitors. Charles Mann of the University of Minnesota has also contributed to the art.

While I have pointed out that water containing iron may loose some of the iron in the distribution system, it is also common for the reverse to occur. By that I mean that water which is relatively free of iron at its source may pick up iron from the distributing pipes and tanks. Of course pure water will not dissolve pure iron, even in the presence of oxygen, but since we are dealing with impure mongrel materials almost anything can happen. Pipe line corrosion is accelerated by the presence of acid gases such as carbon dioxide, nitrogen oxide and hydrogen sulphide; also by fixed acids, and certain salts. In cold water systems carbon dioxide and hydrogen sulphide are effectively and economically removed by aeration. There are numerous ways to aerate water. A type of porous plate has been developed for the diffusion of air under the water. Spray nozzles, riffle boards and agitators provide other means which have certain advantages as well as disadvantages. Aeration incident to pumping with an airlift pump is helpful but usually not justifiable due to the lower efficiency of air lift pumps. Corrosion in cold water systems is also reduced by raising the pH by addition of an alkali. In municipal water treatment pH values of 8.5 to

* Presented at the meeting of the Lake States Section of the Technical Association of the Pulp and Paper Industry, Appleton, Wis., Oct. 8, 1935.
[1] C. F. Burgess Laboratories, Madison, Wis.

[2] "Organic Inhibitors for Iron and Steel," H. A. Levy, *Chemical Industries*, 37, 2, 124-6, August, 1935.
[3] Paper before Wisconsin Section, American Water Works Association (1934).

9.5 are sometimes used and are, of course, most effective. Elimination of dissolved oxygen also reduces corrosion but it is difficult with cold water. In hot water systems corrosion is greatly accelerated, being ten times as great at 180 degrees as at 50 deg. F., and at the boiling point is about one hundred times as rapid as at 50 deg. F. Corrosive waters may eat from one-fourth to one and one-fourth pounds of iron per 1000 gallons. When it is considered that the ordinary useful life of pipe is ended when 20 per cent is eaten away, it may be appreciated why West[4] has estimated that losses on domestic systems exceed $50,000,000 per annum. Prevention of corrosion in hot water systems lies in elimination of dissolved gases, and neutralization of acid, if present. Dissolved oxygen may be reduced by feed water heaters. It may be completely removed by feeding sodium sulphite, or less expensively by passage through a deactivator, which is simply a tank charged with scrap iron.

Iron in water is scarcely ever desirable. In the home, if iron is present to the extent of .3 p.p.m. or over, that is, in excess of one pound per 400,000 gallons of water, it stains plumbing fixtures, clothing and dishes. In higher concentrations iron imparts a distinct metallic taste to the water. Such water makes black tea, and whisky diluted with iron water looks like ink due to the iron tannate formed. Whether or not iron in the water is deleterious is a controversial point. One authority states that vegetables cooked in water containing iron possess an inferior vitamin content. The Public Health Service has set the limit for iron in drinking water served on common carriers at .3 p.p.m. For most purposes iron should not exceed this.

Iron in Industrial Waters

When it comes to industry, the iron content of water is so important that it has been one of the factors which has determined the location of industries. Fortunately, new developments, and a better understanding of water treatment now make it possible for largely overcoming the handicap of bad water. For a long time breweries at Burton, England, were famous for the excellence of their beer. At length competitors analyzed the water and many still treat their supplies to duplicate the Burton water. Brewing experts recognize that the presence of iron in excess of .25 p.p.m. is detrimental to the beer. Iron in the brew water makes the beer dark, even the foam being discolored. The beer is bitter instead of being smooth and mellow. Finally, iron reacts slowly with the albuminoids to form hazy, turbid beer.

In the laundry business, iron is recognized as a menace. It prevents the production of snowy white linens.

Textile mills have long appreciated the importance of practically iron free water for washing, bleaching, dye and kier boiling work.

Iron is objectionable in water for use in storage batteries, for canning vegetables, and manufacturing soap and chemicals.

Singularly enough, there is very little in the literature on the effect of iron in water on modern papers. Iron is known to interfere with bleaching by increasing chemical consumption and in the presence of bleach converting some of the cellulose to oxycellulose which is a weaker and less desirable form. It might be expected to interfere with the production of high alpha cellulose. In dyeing, iron is known to act as a mordant, and with iron absorbed on the cellulose fibers we might expect a change in tinctorial absorptive characteristics. Authorities state that iron should not exceed .15 p.p.m. for paper making. Naturally this will depend on the grade of paper. Believe it or not, the chief chemist of one large paper company told me, about six months ago, that they like a very small amount of iron in their water in order to prevent the paper from getting too bright.

The removal of iron may be accomplished in several ways, the choice of methods depending upon the water characteristics, the purpose for which the water is intended, and the cost of the treatment. Carbon dioxide and hydrogen sulphide gases impede iron removal so that it is advisable to practically eliminate these gases, if they are present, by aeration regardless of the next step. In some types of water, aeration will precipitate the iron fairly promptly so that filtration through sand will remove it. In many cases, however, a considerable residual of iron is left in an unstable condition and continues to precipitate. Addition of alkali sometimes precipitates iron so that it can be filtered out. In the plant mentioned at Wellsburg, W. Va., the raw water is aerated, chlorinated with 8 p.p.m. of chlorine, settled and filtered. Iron is reduced from 1 p.p.m. to a trace. Lime soda softening removes iron as well. Softening water with zeolite also results in reduction of iron. At Wisconsin Rapids and Wausau the public water supplies are freed of iron by a system of aeration followed by treatment with lime and alum, which are allowed to act for a period before filtration through sand. Incidentally, these waters both contain organic color which complicates the removal of iron. Glauconite, called "greensand," is used for iron removal, but requires periodic dosing with potassium permanganate.

Synthetic Zeolite

Our attention was focused on iron removal because we manufacture synthetic zeolite. The presence of very much iron is a detrimental factor to its operation, and as a result after considerable experimenting, we developed a new material for the removal of iron. Ordinarily this material works without chemicals, but a few waters require auxiliary treatment. The material developed is a granular filter medium called "Birm." The grains have an active catalytic surface. When iron in solution in water contacts this surface, under proper conditions, it is instantly precipitated in the form of hydrated ferric hydroxide. Microscopic particles of the hydroxide readily coalesce to form a floc which is filtered out in the bed. One might think that ferric hydroxide would build up on the catalytic surface eventually fouling it and decreasing its activity. Experience with quite a number of installations, however, indicates that this does not happen. Probably the explanation is that the freshly precipitated ferric hydroxide acts catalytically to precipitate more iron, or at the instant of precipitation the hydroxide particles are given a charge which repels them from the catalytic surface. Subsequently the charge is neutralized as the particles coalesce to form the floc. The floc being relatively large is simply loosely entrapped in the interstices between the grains of Birm further down in the bed.

When water contains ferrous iron this is oxidized on contact with the catalytic surface to the ferric form. The oxygen for this reaction is derived from the dissolved oxygen present in the water. It is obvious, therefore, that unless there is sufficient dissolved oxygen present it is necessary to supply it in some way such as aeration, sniffling air on the suction side of the pump, or even feeding air from a compressor. The amount of dissolved oxygen required is insignificant, being in the neighborhood of 15 per cent of the iron. The presence of hydrogen sulphide indicates a deficiency in dissolved oxygen and necessitates aeration.

Hydrated ferric hydroxide, while quite insoluble in water, is slightly soluble in the presence of certain organic

[4] *Ind. Eng. Chem.* 14: 601-7 (1922).

materials such as sucrates. A 10 per cent solution of cane sugar, for example, will dissolve 3.4 p.p.m. of the hydrated ferric hydroxide. Strangely enough, the solubility actually increases as the sugar content decreases, although just how far this goes has not yet been determined. The effect of certain organic materials in peptizing the ferric hydroxide sol and dispersing the floc increases the difficulty of catalytically removing iron from solutions containing them. Organic materials may also act as protective colloids. Wisconsin River water is a typical example of this type of solution. Experiments indicate that in order to handle it with Birm it is necessary to use a coagulant such as alum, but in less amount than would be required in the absence of Birm.

Naturally, Birm cannot be expected to function in the presence of much acidity. We have no installations operating on water with pH below 6.5.

The practical apparatus for the use of Birm includes a container to support the bed of Birm. The aerator part is usually unnecessary. Where there is hydrogen sulphide in the water, however, it is a good plan to drop the water from the aerator to a surge tank from which another pump delivers it through the Birm. Flow rates of 3, and occasionally to 5 g.p.m. per square foot of bed area are practical, depending upon local conditions and character of the water. The bed depths being used are from 24 to 36 inches. The pressure loss through the filter is about 2 to 4 pounds per square inch when fresh and this increases as precipitated iron or other suspended matter is filtered out. It is good practice to backwash when the pressure loss reaches 6 to 10 pounds, depending upon flow rate, etc. If the backwashing is neglected, precipitated iron will break through and emerge as a yellow stream at a back pressure of about 18 to 20 pounds at a 5 g.p.m. per square foot flow rate. In backwashing a flow rate of 12 to 15 g.p.m. per square foot upflow through the bed is advisable for 5 to 10 minutes when the bulk of the accumulations will be removed. The bed goes into suspension and the floc floats up. For this backwashing operation it is best to use iron-free water, but in case this is impractical the small amount of iron precipitated in the lower part of the bed can be flushed out by a rewash, or downflow to the sewer for a few minutes before the unit is placed in service.

A vertical Birm pressure unit includes the usual pipe lateral or perforated plate under drain system used in filters, a 15-inch bed of graded crushed stone or gravel, and the Birm. Sufficient space, called freeboard, must be left between the top of the bed and the top distributor.

Birm can also be used in gravity type filters. Construction under the Birm is much the same as in the pressure system. Water is usually sucked through instead of being forced through the bed.

The water treating art has advanced rapidly within the past 15 years which have witnessed softening, activated carbon and iron removal. The removal of iron is being widely practiced as a realization of the troubles it entails, grows. I believe that the catalytic removal of iron invariably offers a real economy over other methods.

Pulp and Paper Industry Literature Review

Abstracts of Articles and Patents Compiled by the Abstracts and Bibliography Committee of the Technical Association of the Pulp and Paper Industry, A. Papineau-Couture, John F. Ohlson, C. E. Peterson and Clarence J. West, Chairman

Copies of United States Patents can be obtained from the United States Patent Office, Washington, D. C., for 10 cents each. Send currency, not stamps.

Power Plant

The Small Steam Turbine Applied to Power Stations and Industrial Works. A. Flindle. Paper Maker & Brit. Paper Trade J. 89:TS38-48, TS63-64 (March, April, 1935).—A general discussion dealing with the advantages and general applications of small steam turbines, their design characteristics, and their operation and maintenance. —A.P.-C.

New Methods Simplify Control of Modern Water Filter Plant. Kenneth Shibley. Pacific Pulp Paper Ind. 9, No. 4:11-12 (April, 1935).—A description of the recently constructed filter plant of the Washington Pulp and Paper Corp., at Port Angeles.—A.P.-C.

An Example of Industrial Co-operation. Co-operation Between Machinery Builder, Oil Refiner and Paper Maker. R. S. Papier 38: 445-456 (May, 1935).—A discussion of the importance of proper co-operation between pulp and paper machinery builder and lubricating oil producer, and between the latter and the user of the machinery, and of the savings which may result from such co-operation.—A.P.-C.

Mills

Hydrolysis of Lignocellulose. Emes. Lesokhimicheskaya Prom. 3, No. 4:20-24 (1934); C. A. 29:4938.—Various recommendations are made for the erection of new plants for the hydrolysis of lignocellulose.—C. J. W.

Nickel Alloys in the Paper Making Industry. A. B. Everest. Paper Maker & Brit. Paper Trade J. 89:TS54-59 (April, 1935).—A description of the applications of nickel alloys in pulp and paper making.—A.P.-C.

Higher Quality the Aim of Soundview's Improvement Program. Anon. Pacific Pulp Paper Ind. 9, No. 4:6-9 (April, 1935).—A description of recently completed improvements in the equipment at the pulp mill of the Soundview Pulp Co., and more particularly of the operation of the latest type of Chemipulp Process with liquor precirculation.—A.P.-C.

Grays Harbor Completes Improvement Program. Anon. Pacific Pulp Paper Ind. 9, No. 2:12-14 (Feb., 1935).—A brief description of the recently completed addition to the mill of the Grays Harbor Pulp and Paper Co., Hoquiam, Wash., which will enable it to produce rayon pulp in addition to high grade bleached sulphite and bond paper.—A.P.-C.

Contribution to the Calculation of Individual Costs in Paper Mills. Rudolf Mehl. Wochbl. Papierfabr. 66. No. 7:117-21; No. 8:147-48; No. 11:205-07 (Feb. 16, 23, March 16, 1935).—In aiding the German paper industry at arriving at a standard system for calculation of costs of different papers, the author present a very comprehensive picture of the entire subject matter. The costs are first divided into 11 main groups and each group divided into one or more sub-divisions; all of which are discussed more or less. Numerous curves and equations are given to illustrate the relations between various factors.—J. F. O.

Studies of Tensile and Bursting Tests*

By Roger C. Griffin[1] and Russell W. McKinley[2]

The Paper Testing Committee of the Technical Association of the Pulp and Paper Industry has under consideration certain revisions of the methods for determining tensile strength and bursting strength of paper. The revisions as proposed by J. d'A. Clark have to do with the rate of application of the load.

In order to compare results obtained by the present methods with those obtained by the proposed procedures we have made a series of tests on a number of papers of rather widely different types. The papers used for the purpose were as follows:

Sample 1 Medium weight kraft wrapping
2 Heavy weight kraft wrapping
3 Manila folder stock
4 Blotter
5 Newsprint (unprinted)
6 Light weight manifold
7 Heavy manila folders

Tensile Test

The present official TAPPI standard T 404 m specifies that the stressing jaw shall be operated at a speed of 12 inches per minute and that the testing instrument shall be of such capacity that the tensile strength of the paper tested will not be greater than 90 nor less than 10 per cent of the capacity of the machine. It is obvious, however, that the rate of application of stress to the paper depends not only upon the speed of the jaw, but also the weight of the pendulum. With a fixed jaw-speed the load will be applied more rapidly with a heavier pendulum. To partially overcome this Clark has proposed that the break shall occur within 10 to 30 seconds from the time the load is applied.

The machine used for the tensile tests was a Schopper tensile machine, serial No. 5497, power driven. The machine has two scales and two interchangeable pendulum weights. The A scale is graduated from zero to 14 pounds in ½-ounce divisions. Each division therefore represents 1/32 or approximately 0.03 pound. The A weight, used with this scale, weighs 814.5 grams. The B scale is graduated from zero to 70 pounds in ¼-pound divisions and the B weight weighs 5505 grams.

Ten sheets (8 x 11 inches) of each sample were tested. Four strips exactly 0.50 inch wide were cut from each direction of each sheet. The strips in each direction were cut adjacent to each other and arranged in four series of 10 strips for each sample, series 1 consisting of the strips cut from the left-hand edge of each sheet, series 2 containing the strips adjacent to these, and so on. Each strip was marked with the sample number, the direction in which cut (m or c), and the sheet number. The strips were thoroughly conditioned at standard TAPPI conditions before testing. As each strip was tested the time was measured with a stop-watch from the application of the load until rupture occurred. The results are shown in Table I.

The letters m and c after the sample number indicate that the strips tested were cut in the machine or cross direction, respectively. As one purpose of the tests was to get a wide range of actual tensile figures, strips cut from both directions of the paper were not in all cases tested. The results are tabulated in ascending order of magnitude and represent actual pounds stress on a ½-inch strip recorded at time of rupture.

TABLE I
TENSILE TESTS, POUNDS PER HALF INCH

		Present Method		Proposed Modification		Percentage Variations		
		Series	Series	Series	Series	Series	Series	Series
	Sample	1	3	2	4	1 & 3	2 & 4	1+3 & 2+4
5c	Newsprint							
	Maximum ...	2.37	2.46	2.28	2.36	....	....	....
	Minimum ...	2.00	1.90	1.71	1.81	....	....	....
	Ave. of 10..	2.18	2.10	2.05	2.06	3.7	0.5	....
	Ave. of 20..	2.14		2.05				—4.5
	Seconds	8.7	8.2	16.8	16.9	....	....	....
6c	Light manifold							
	Maximum ...	2.96	2.96	....	....	....	....	....
	Minimum ...	2.71	2.75	....	....	....	....	....
	Ave. of 10..	2.79	2.83	....	....	1.4	....	....
	Ave. of 20..	2.81						
	Seconds	11.7	12.2	....	....	....	....	....
6m	Light manifold							
	Maximum ...	6.81	7.21	....	....	....	....	....
	Minimum ...	5.31	6.31	....	....	....	....	....
	Ave. of 10..	6.25	6.81	....	....	8.5	....	....
	Ave. of 20..	6.54						
	Seconds	21.3	22.7	....	....	....	....	....
4c	Blotter							
	Maximum ...	9.18	9.56	9.45	9.18	....	....	....
	Minimum ...	8.78	8.62	8.63	8.63	....	....	....
	Ave. of 10..	9.02	9.09	9.06	9.01	0.6	0.6	—0.2
	Ave. of 20..	9.06		9.04				
	Seconds	32.8	33.3	14.2	14.2	....	....	....
2c	Heavy kraft							
	Maximum ...	11.09	11.59	11.5	11.25	....	....	....
	Minimum ...	8.78	7.38	9.25	9.5	....	....	....
	Ave. of 10..	9.86	9.77	10.38	10.48	0.9	1.0	+5.7
	Ave. of 20..	9.82		10.43				
	Seconds	37.0	36.4	12.0	12.3	....	....	....
1m	Medium kraft							
	Maximum ...	15.5	16.25	....	....	....	....	....
	Minimum ...	13.5	13.0	....	....	....	....	....
	Ave. of 10..	14.58	14.80	....	....	1.5	....	....
	Ave. of 20..	14.69						
	Seconds	12.2	12.6	....	....	....	....	....
4m	Blotter							
	Maximum ...	16.5	16.75	....	....	....	....	....
	Minimum ...	14.75	15.0	....	....	....	....	....
	Ave. of 10..	15.70	15.78	....	....	0.5	....	....
	Ave. of 20..	15.74						
	Seconds	11.9	12.0	....	....	....	....	....
2m	Heavy kraft							
	Maximum ...	22.25	23.5	....	....	....	....	....
	Minimum ...	19.0	19.5	....	....	....	....	....
	Ave. of 10..	20.60	21.95	....	....	6.3	....	....
	Ave. of 20..	21.28						
	Seconds	15.5	16.5	....	....	....	....	....
7c	Heavy manila folder							
	Maximum ...	25.25	25.25	....	....	....	....	....
	Minimum ...	22.75	23.25	....	....	....	....	....
	Ave. of 10..	23.82	24.22	....	....	1.7	....	....
	Ave. of 20..	24.02						
	Seconds	20.7	20.8	....	....	....	....	....
3m	Manila folder							
	Maximum ...	35.75	36.50	....	....	....	....	....
	Minimum ...	31.75	32.75	....	....	....	....	....
	Ave. of 10..	34.35	34.30	....	....	0.1	....	....
	Ave. of 20..	34.33						
	Seconds	23.7	23.6	....	....	....	....	....
7m	Heavy manila folder							
	Maximum ...	59.25	60.0	59.0	59.4	....	....	....
	Minimum ...	54.25	56.5	48.7	56.0	....	....	....
	Ave. of 10..	56.45	58.35	56.14	58.45	3.3	4.0	....
	Ave. of 20..	57.40		57.30				—0.2
	Seconds	40.8	42.4	24.1	25.2	....	....	....
					Average	2.8	1.5	—0.05

Series 1 and 3 represent duplicate determinations, each on 10 strips, made by the present TAPPI official method. Of the 11 groups of strips tested only four came outside the time limit of 10 to 30 seconds proposed by Clark. Series 2 and 4 show the results obtained on these four papers when additional strips were tested with the weight on the pendulum adjusted to bring the breaking time within the prescribed limit. On sample 2c Series 2 and 4 were run with the B weight and Series 1 and 3 with the A weight.

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Contribution from the laboratory of Arthur D. Little, Inc.

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On the 11 groups of duplicate tests in Series 1 and 3 the agreement was in most cases satisfactory, the average deviation being 2.8 per cent and in only two cases being over 5 per cent. When all eleven groups are run within the proposed time limit of 10 to 30 seconds, the average deviation is 2.6 per cent. There is therefore no appreciable difference in the agreement to be expected between duplicate tests by the two procedures.

In the four cases where we have tests by the present official method which fall outside the proposed time limit, repetition of the tests by the proposed modification gave practically identical tests on samples 4c and 7m. On sample 5c the modified procedure gave a result 4.5 per cent lower. This was a very weak paper, however, and the actual difference between the two procedures was only 0.09 pound. On sample 2c the modified procedure gave a result 5.7 per cent higher. The breaking-time difference in these two tests is 24 seconds and yet one of them is only 7 seconds above the upper proposed limit. On this particular paper it would appear that tests made at the upper and lower proposed time limits, i.e. 10 and 30 seconds, might vary by as much as 5 per cent. On the other hand with samples 4c and 7m there are differences between the tests by the two procedures of 19 and 17 seconds, respectively, and yet in each case they check within 0.2 per cent. Further, in the case of sample 5c a difference of only 8 seconds gives a variation of 4.5 per cent.

These tests indicate, as would be expected, that rapid application of the load tends to give somewhat higher tensile tests. The quantitative effect, however, apparently varies with the type of paper. From theoretical conditions, for precise results the time required for break to occur should be rigidly specified. For practical reasons, however, it is necessary to allow some leeway on the time. It would require a very extended investigation to establish the proper tolerances, and from the data available there do not seem to be sufficient advantages in the proposed modification to warrant incorporating it into the standard procedure except as a suggestion. For nearly all purposes the present method should insure sufficiently reliable results. It is suggested that the method require the recording for each break of the time in seconds from the application of the load until the break occurs and that a note be incorporated in the method after the section on Procedure, reading substantially as follows:

The rate of application of the load is influenced by the speed of the moving jaw and the weight of the pendulum. Rapid application of the load gives a higher tensile figure, the effect varying with different papers. It is desirable to have the break occur between 10 and 30 seconds from the time of application of the load. For precise work where a tolerance of less than about 5 per cent is desired, as in testing hand sheets of pulp, the time of break should be held within these limits, preferably as near 20 seconds as possible. This can be accomplished by varying the speed of the moving jaw or adjusting the weight of the pendulum.

Mullen Test

The present official TAPPI standard T 403 m specifies that the pressure on the diaphragm be applied at a uniform rate obtained by turning the hand wheel of the Mullen tester at the rate of 120 r.p.m. and that the gage used must be such that the bursting strength of the paper tested will not be greater than ¾ nor less than ¼ of its capacity. Clark has proposed that the pressure shall be applied at such a rate that the paper will be burst in 2.0 seconds, plus or minus 1/5 second; or, if the bursting pressure is over 60 pounds, the time in seconds required to produce the burst shall be within 1/5 second of one-thirtieth of the bursting pressure.

A comparison of the two procedures for bursting strength was made on the seven papers previously listed. Ten sheets about 6 inches square were cut from each paper. After conditioning, a single burst was made on each sheet in one corner, using the present official method. These were recorded as Series A. The sheets were then turned over and another series of bursts (Series B) made on the opposite corner of the opposite surface. Series C and D were made in a similar manner on the two remaining corners by the proposed modified procedure.

Three Mullen testers, each hand driven, were used for the tests, one being equipped with two gages arranged on a T connection with valves so that either gage could be closed off from the pressure line. The specifications of the gages were as follows:

Gage	Maximum Graduation pounds	Minimum Graduation pounds	Available Range (by TAPPI Standard) Minimum	Maximum
A	40	½	10	30
B	80	½	20	60
C	160	1	40	120
D	600	5	150	450

The results of the tests are shown in Table II. In the case of three samples the tests made by the present official method on one corner of each of 10 sheets varied by over 7 per cent from those made on the opposite corners of the same sheets. The average variation of the seven samples was 4.5 per cent. Tests on opposite corners by the proposed revision showed a maximum variation of 3.3 per cent and an average of only 1.7 per cent for the seven samples. Using 20 tests for each sample, results by the two procedures are all within 5 per cent of each other. Nevertheless the proposed modification gives more consistent results and it would seem to be advisable to adopt it for precise work.

TABLE II
MULLEN TESTS

Sample	Gage Used	Present Method Series A	Present Method Series B	Proposed Modification Series C	Proposed Modification Series D	Percentage Variations Series A & B	Series C & D	Series A+B & C+D
5 Newsprint	A							
Maximum		9.0	10.5	9.0	9.0	....	....	....
Minimum		6.5	7.0	7.0	7.0	....	....	....
Ave. of 10		7.95	8.60	8.10	8.15	7.8	0.6	....
Ave. of 20		8.28		8.13				—1.8
6 Tissue	A							
Maximum		14.5	14.5	13.5	13.5	....	....	....
Minimum		13.0	12.0	12.0	12.0	....	....	....
Ave. of 10		13.55	13.25	12.85	12.70	2.2	1.2	....
Ave. of 20		13.40		12.78				—4.8
4 Blotter	B							
Maximum		34.5	34.0	36.0	34.0	....	....	....
Minimum		30.5	30.0	30.5	28.5	....	....	....
Ave. of 10		32.65	32.40	32.45	32.70	0.8	0.8	....
Ave. of 20		32.53		32.58				+0.15
1 Medium kraft	B							
Maximum		50.0	50.5	47.0	49.0	....	....	....
Minimum		38.0	40.0	40.0	36.5	....	....	....
Ave. of 10		45.10	43.95	43.05	44.50	2.6	3.3	....
Ave. of 20		44.53		43.78				—1.7
2 Heavy kraft	C							
Maximum		76.	66.	70.	70.	....	....	....
Minimum		59.	58.	56.	54.	....	....	....
Ave. of 10		65.8	60.9	63.7	62.2	7.7	2.4	....
Ave. of 20		63.4		63.0				—0.6
3 Manila folder	C							
Maximum		71.	71.	72.	74.	....	....	....
Minimum		56.	51.	68.	60.	....	....	....
Ave. of 10		63.9	65.9	66.0	67.0	3.1	1.5	....
Ave. of 20		64.9		66.5				+2.4
7 Heavy manila	D							
Maximum		190.	170.	175.	190.	....	....	....
Minimum		150.	145.	140.	140.	....	....	....
Ave. of 10		170.0	158.0	159.5	156.5	7.3	1.9	....
Ave. of 20		164.0		158.0				—3.7
					Average	4.5	1.7	—1.4

The Retention of Pigments in Paper*

By J. H. Haslam[1] and F. A. Steele[2]

Abstract

Pigments can be retained in paper by any of three mechanisms, namely filtration, coflocculation and mechanical attachment. Of these only an insignificant fraction can be retained by filtration under ordinary conditions. Only the pigment retained by mechanical attachment can be directly measured, but since this is probably 30 per cent or less of the total pigment retained in most cases of commercial paper where there is a circulation of white water the most of the pigment retained must be retained by coflocculation.

In the past many studies of retention have been published, most of which have dealt primarily with the retention characteristics of various fillers or with the empirical results of variations in furnish and machine operation *(1, 2, 3, 4, 5)*. In a few cases attempts have been made to explain the mechanism of retention and some experimental work has been conducted which was primarily designed to throw some light on this subject *(6)*. It is, however, hardly necessary to present detailed evidence in support of the statement that no satisfactory and comprehensive analysis of the mechanism of retention has yet been formulated.

With the advent of opaque pigments in the paper industry the manufacturers of these pigments have found it necessary to supplement the information already available on the effect of various factors on retention, since losses of these more expensive pigments are more serious, economically, than losses of the ordinary fillers. In connection with these studies, considerable work has been done in this laboratory on the more fundamental aspects of the problem with the intention to learn, if possible, the mechanism by which pigments are ordinarily retained by paper fibers. It was felt that sufficient ground had been covered to make it well worth while to report the progress which had been made to date.

There are three possible mechanisms by which pigment may be held in the web during its formation: (1) Filtration, (2) Coflocculation, (3) Mechanical Attachment. For the purpose of this discussion these terms will be defined as follows:

By filtration is meant the separation of the pigment from the water leaving the web due solely to the fact that the interstices between the fibers through which pigment particles must pass are smaller than the particles themselves. If a bucket full of marbles in water were poured on a piece of window screen the marbles would be retained on the screen by simple filtration. In addition, any groups of pigment particles which are held together as flocs or aggregates which fail to find an opening large enough to pass through are regarded as being retained by the same mechanism. In short, filtration, as defined here, is responsible for the retention of any pigment which remains in the web simply because it fails to find an opening large enough to pass through.

By coflocculation is meant the attachment of pigment particles to the fiber walls due to the play of interfacial forces which are analogous in all respects to those which cause ordinary flocculation. Any pigment which is so attached to any other substance which is attached to the fiber would be regarded as being retained by the same mechanism. As will be seen later, particles of pigment will flocculate to other particles of pigment already coflocculated to the fiber.

By mechanical attachment is meant the attachment of pigment particles to fiber by forces not governed by the laws applying to flocculation. Pigment so held could probably be distinguished from pigment held by the ordinary interfacial forces only if the mechanical forces were much the larger. By way of illustration, if a pigment particle were to be wedged into an imperfection in the surface of the fiber or if it became embedded in a layer of plastic material which might be on the fiber wall, such a particle would be regarded as being mechanically attached. Coflocculated pigment is reversibly attached to the fiber, while mechanically attached pigment is irreversibly attached.

The evidence that there is no other mechanism by which pigment can be retained in the web is entirely negative; no one seems to be able to think of another. It seems likely, however, that these three pictures pretty well cover the possibilities.

We will take these three mechanisms in turn, consider how they should be affected by variations in the furnish and in forming the sheet, and examine and interpret the data which have been obtained with the intention of proving or disproving their existence and, insofar as possible, their relative importance.

Experiments and Results

Experimental Procedure

As the retention data reported in this paper were obtained from the hand sheet machine, it cannot be expected to agree quantitatively with commercial experience. In most cases the fiber used was 100 per cent bleached sulphite, processed in a 1½-pound Valley beater or in a high speed mixer. The mixer was generally preferred for most of the work as it was much simpler to operate and could be better controlled. Freeness determinations were not made, but all of the furnishes used in a given comparison were prepared so that they were quite comparable.

The handsheet machine used was of the British design accepted by TAPPI as a tentative standard, and permitted the preparation of sheets over a wide range of conditions.

Filtration

The particles of the opaque pigments as well as most of the particles of clay are entirely too small to be retained by filtration to any important degree as single particles. As a matter of fact, a dilute, well-dispersed suspension of such a pigment will pass through an ordinary filter paper. By particle size is meant the size of the single particle or aggregate of particles which cannot be subdivided by the forces ordinarily encountered in the paper making operation. It is of no importance whether these particles are single crystallites or not. Single particles of the coarser fillers, such as talc, may very possible be retained by filtration but will not be further considered in this discussion.

Since single particles cannot be retained by filtration, any pigment so retained must be flocculated and filtration should be increased by increased flocculation. Flocculation, in turn, is favored by high pigment concentration, high pigment-liquid interfacial tension, and small particle size; it is decreased by the reverse of the above and by

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agitation. Filtration is also increased by any condition which increases other forms of retention, since the pigment tends to close up the web. Furthermore, the fraction of the total pigment furnished which is retained by filtration should be increased by an increase in the pigment-fiber ratio in the furnish when sheets are being made of the same fiber weight content. It should be increased by increase in sheet weight at constant consistency.

Since the retention of pigment by filtration should be increased by an increase in the pigment-fiber ratio when forming a sheet of constant fiber content, it is immediately evident that filtration is not the controlling factor in retention, since it is a matter of common knowledge that the greater the amount of pigment furnished the lower is the fraction retained.

The effect of increased sheet weight on retention at constant consistency is shown in Fig. 1. Fifty per cent pigment on the fiber was used in the furnishes for this curve, which would have given 33 per cent in the sheet if 100 per cent retention had been obtained. This curve also leads to the conclusion that the filtration is not of controlling importance, since, if it were, it should rise rapidly to nearly 33 per cent before leaving off. A significant characteristic of filtration is that success leads to success, since anything which increases retention by filtration closes the filtering layer and thus tends further to increase it. Thus, if the sheet weight were increased, which would tend to increase the fraction of pigment filtered out, a further increase in sheet weight should further increase the retention by more than a proportional amount. Actually, the effect of increasing sheet weight decreases rapidly and does not give retentions approaching 100 per cent at any sheet weight within experimental possibilities.

As a matter of fact, the increase in retention which is obtained with increase in sheet weight, which follows the primary assumption in regard to filtration in direction, if not in amount, is by no means evidence that filtration is in any way concerned; it can be explained just as well by assuming that the increase in retention from increase in sheet weight is a consequence of the resulting decrease in drainage rate which, as will be shown, is one of the controlling factors in coflocculation. In Fig. 2 is shown the effect of decreased drainage rate of constant sheet weight, and it is evidently similar to the effect of increased sheet weight, which inevitably causes slower drainage.

It is not to be concluded from this discussion that no pigment is retained in the sheet by simple filtration. As a matter of fact, it seems inconceivable that no pigment should remain in the web simply because it was mechanically obstructed and failed to find an opening large enough to pass through. It does appear, however, that this phenomenon is of relatively small importance so far as the total retention is concerned, and there is little or no direct experimental evidence that it take place at all.

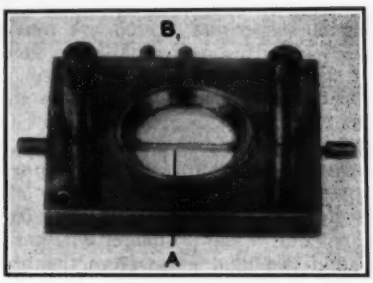

FIG. 3
The cell used in the microscopic examination of the pigmentation of paper fibers.

COFLOCCULATION

In discussing coflocculation an experiment will be described which gave direct visual evidence that the phenomenon does exist; that pigment particles or groups of particles coming into contact with the surface of a fiber do adhere to the fiber with a force sufficiently great to withstand the rush of water past it as the web is formed.

These experiments were conducted with the aid of a simple attachment to the stage of a microscope which is shown in Fig. 3. It is essentially a capillary tube (a) about 0.7 millimeters in diameter which is mounted between thin glass plates and surrounded with oil or water. This immersion liquid is introduced into the cell through small holes closed with plugs, (b). The ends of the capillary are attached to the vertical tubes to which is connected the rubber tubing. Arranged inside the capillary is a fine platinum wire with a very tiny hook on the end which in use is within, or barely outside, the field of the microscope. In operation the cell is mounted on the stage of the microscope and water containing a very few fibers is permitted to flow through the capillary. By watching the cell through the microscope one can observe when one or more suitable fibers have become fastened on the little wire hook. By passing a dilute pigment suspension through the capillary the process of the pigmentation of a single fiber can be observed, coflocculation in this case being the only mechanism involved. It is possible to observe qualitatively the effect of changing various factors, such as the pH of the solution and the velocity of the liquid flowing past the fiber. As one watches the fiber, the pig-

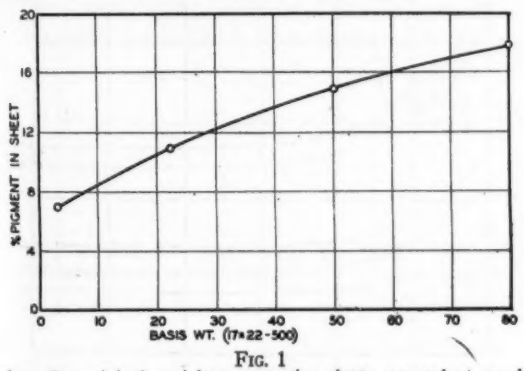

FIG. 1
Showing effect of basis weight on retention sheets prepared at equal consistency.

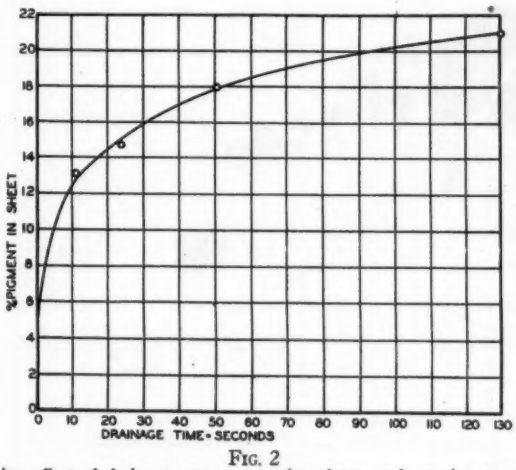

FIG. 2
Showing effect of drainage rate on retention sheets made at the same basis weight (15 lb. 17x22-500).

ment particles in suspension, which are moving far too rapidly to be observed as individuals, are seen to collide with pigment already attached to the fiber and adhere there. This process may continue until at some point the load of pigment becomes too great to withstand the rush of water and a whole clump of pigment is lost, whereupon the process begins over again. Individual fibrils attached to the fiber often become pigmented much more readily than the fiber itself and oftentimes the fibril accumulates so much pigment that it can no longer withstand the force of the water and is pulled loose from the fiber, rushing downstream with its load of pigment. Inspections of material accumulated from save-alls have shown it to contain a great deal of material which is composed largely of fibrils carrying relatively enormous loads of pigment.

Satisfactory motion pictures of this pigmentation phenomenon have been made by the use of this apparatus.

The above observations have established that coflocculation of pigment and fiber does take place under conditions comparable to those on the paper machine. Since coflocculation, like flocculation, is a reversible phenomenon, it should be increased by those facts which increase the forces between the pigment and fiber, and between pigment and pigment, and should be decreased by an increase of those forces which tend to remove the pigment from the fiber, particularly the shearing force, due to relative velocity of water and fiber. Qualitatively, it is easy to show that the effect of changes in furnish and sheet-forming conditions on overall retention is almost invariably as would be predicted were the retention due to coflocculation alone.

In Fig. 4 are shown the effects of alum and starch on retention, both of which are known to exert a flocculating influence on the materials in question. The behavior of starch is particularly interesting in this connection in that it exerts a very strong flocculating influence on pigment, but not so great a one on fiber, while alum flocculates both pigment and fiber but has less effect on pigment than does starch. It should be stated that these effects hold particularly for zinc sulphide pigments; some pigments are dispersed rather than flocculated by starch. The gain in retention resulting from the use of starch alone is small as shown in Fig. 4, and in commercial practice in the presence of alum there may not be an apparent advantage.

So far as the changes in the forces tending to remove the coflocculated pigment are concerned, the most direct

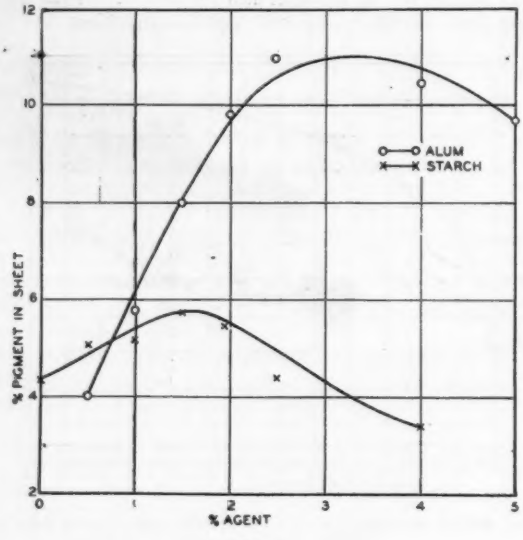

FIG. 4
Showing effect of various materials on retention.

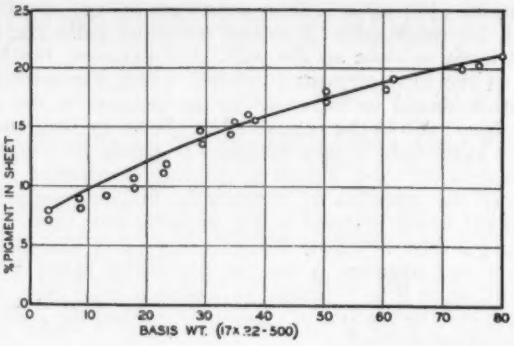

FIG. 5
Showing effect of basis weight on retention sheets prepared at equal volume.

experiment is the one showing the effect of drainage rate on retention, the results of which are shown in Fig. 2. In this case nothing is changed but the velocity of the water past the fiber as the sheet is formed, and results are quite as would be predicted.

Considerable time has been spent in studying the effects of other variables such as sheet weight, consistency, etc. In the case of sheet weight, Fig. 5, the effects are thought to be due largely, if not entirely, to the effect of sheet weight on drainage rate.

It will be noticed that these sheets were made by using the same volume of furnish in the head box, but at varying consistency, while those illustrated in Fig. 1 were made at equal consistency. The curves are similar, although the curve Graph IV is steeper, showing that the higher consistency causes increased retention.

Many of these results are hard to interpret because it is difficult, if not impossible, to change but one factor at a time. For example, in the case of consistency, if distilled water is used as a diluent in lowering the consistency, the concentration of alum and other dissolved substances will be reduced; if a dilute alum solution is used as the diluent, there would be considerable question as to the concentration of alum to use. The dilutions might be made at a constant pH, but even then it is questionable whether nothing else would be changed and indicators would probably not be sensitive enough for the purpose.

Mechanical Attachment

If, after a hand sheet has been formed on the wire in the usual way, water is run up through the wire, the sheet is floated off and can readily be redispersed in the water with the perforated stirrer. The pulp can then be dropped

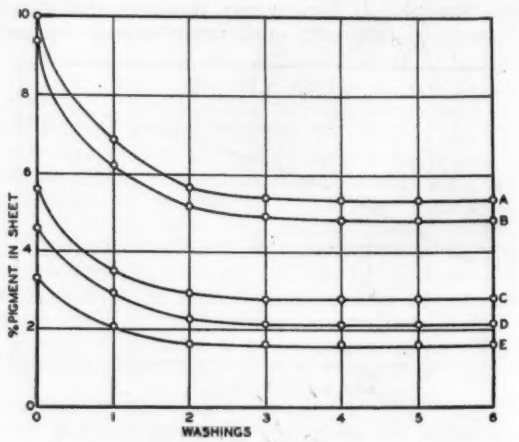

FIG. 6
Showing effect of washing on retention of various pigments.

a second time and the sheet reformed; this process of repulping and reforming a sheet can be repeated as often as is desired. Successive washings continuously decrease the amount of pigment retained in the sheets down to a point where it begins to level off, as shown in Fig. 6, illustrating the effect of washing of sheets that have been pigmented with five different pigments A. B. C. D. and E. In this case, about 7 liters of water were used for each washing.

Since coflocculated pigment is held rather loosely to the fiber it is largely removed during the rather violent stirring which the repulped sheet receives, and only a fraction of it coflocculates to the fiber again. Any pigment which had been retained by filtration was so retained more or less as an accident in the first place and most of it must be lost when the sheet is reformed. After repeated washings, however, when no further pigment is being removed and most of the pigment originally retained by coflocculation or filtration must have disappeared, there remains a by no means negligible amount of pigment so firmly attached to the fiber that it cannot be washed away. This pigment is held by the fiber by forces much greater than those of coflocculation and so has been termed "mechanically attached".

The effect of beating time and the amount of pigment charged on the amount mechanically attached is shown in Figs. 7 and 8. In addition, it was observed that if a slurry of pigment was added to previously beaten pulp with thorough agitation but with no further beating, the amount of mechanically attached pigment was very small, although considerable pigment was retained by the unwashed sheet. It will be noted that although beating time has an appreciable effect on mechanically attached pigment, it made little, if any, difference in overall retention in the unwashed sheet.

The nature of the forces involved in mechanical attachment was the subject of much discussion and speculation until it was found, in the course of a very careful microscopic investigation, that most, if not all, of the pigment so attached was present in the lumen of the fiber; usually sticking to the inside wall, but in no sense embedded in the wall itself. At first thought it seems quite surprising that any important amount of pigment should actually find its way into the inside of the minute tubes which are sulphite fibers. Nevertheless, little pigment has been found elsewhere in a thoroughly washed pulp and the belief that much of it actually is inside the fiber is supported by another bit of evidence.

In the first place, while studying the pigmentation of fibers under the microscope, it has been observed that in the lumen of some fibers pigment suspended in water can be seen moving slowly along the length of the fiber, while the pigment suspended in the liquid outside is moving so

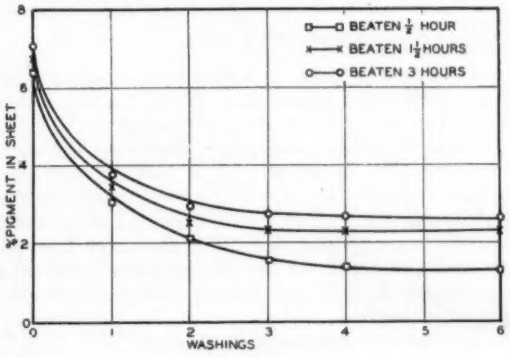

FIG. 7
Showing effect of beating time on mechanically attached pigment.

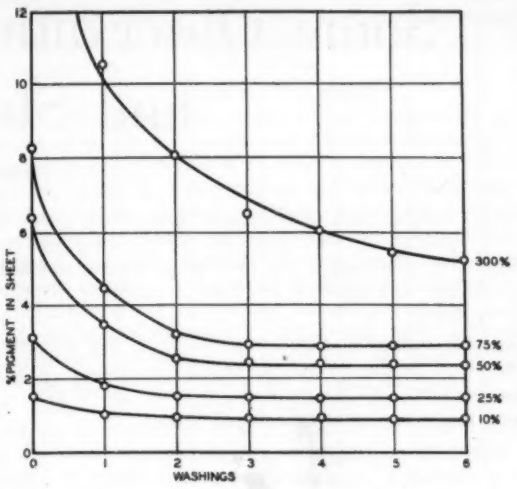

FIG. 8
Showing effect of per cent pigment charged on retention.

rapidly that it is visible only as streaks of light. In some cases these particles are actually moving in the direction opposite to that of the outside liquid, due doubtlessly to a fortuitous effect of the eddy currents which surround the fiber. Thus, not only has the pigment been found inside the fiber in the pigmented sheet but the process of the fibers becoming pigmented on the inside has been observed.

Conclusions

It has been shown that of the three mechanism by which pigment can be retained in paper only an insignificant fraction is probably retained by filtration under ordinary conditions. Only the pigment retained by mechanical attachment can be directly measured, but since this is probably 30 per cent or less of the total pigment retained in most cases of commercial paper where there is recirculation of the white water the majority of the pigment retained must be retained by coflocculation. Laboratory tests, however, without recirculation show the mechanically attached pigment to be as high as 45 per cent to 50 per cent. In support of this conclusion it has been shown that, in general, variations in the furnish and sheet making conditions influence retention in the way that would be predicted from the supposition that coflocculation was the predominant factor.

Note: This method of microscopic observation of fibers in the presence of moving water might be of value in fundamental studies of sheet formation. While the authors are by no means experts in this matter, they are not aware that cognizance has been taken of the behavior of fibrils in the presence of moving water. For example, fibrils lying invisibly along the surface of the fiber when the water is moving slowly immediately separate themselves from the fiber and protrude out into the stream of water as the velocity of the water increases, only to collapse again back to the surface of the fiber as the velocity of the water is reduced. To the authors it was especially surprising to notice that not infrequently these fibrils were attached to the fiber on the upstream end and thus, as the velocity of the water increased, the unattached downstream end moved away from the fiber against the stream of water, which in itself must have tended to prevent such a motion. This behavior may possibly have been due to a twist imparted to the fiber by the rush of water. These facts are surely not without significance in sheet formation on the wire where the velocity of water past the fiber is of the same order of magnitude as in the capillary tube, but the interpretation of these phenomena is left to experts in this field.

Literature Cited

(1) Kress and McNaughton, "Retention of Fillers by Paper Pulp," *Paper Trade J.*, 65, No. 14; 64-66 (Oct. 4, 1917).
(2) Willets, W. R., "Factors Affecting Retention," *Paper Trade J.*, 101, No. 13; 81-86 (Sept. 26, 1935).
(3) Reymond and Bonnet, "Paper Fillers," *Papeterie* 45; 681-689 (1923); C. A. 17; 3419.
(4) Vestergren, J., "Tests with Loading Materials in Paper," *Papierfabr.*, 9: 217-223 (1911); *J. Soc. Chem. Lud.* 30: 352 (1911).
(5) Chilson, W. A. and Baird, P. K., "Forest Products Laboratory Research on Paper Machine Variables," *Paper Trade J.*, 97, No. 14: 43-46, (Oct. 5, 1933).
(6) Atsuki, K. and Nakamura, M., "The Mechanism of the Loading of Paper," *Cellulose Lud*, 2: 46-60 and 3: 5-8; C. A. 22: 163 and 22: 3176 (1927).

Some Observations on Burst, Tensile and Stretch Tests*

James d'A. Clark[1]

From time to time observations have led to the belief that the existing TAPPI methods for bursting and tensile strength are inadequate for precise purposes, notably for pulp testing, and possibly for use in cases of disputes of paper quality.

The experimental results in Table I are of interest. These were made, except as otherwise stated, according to the present TAPPI methods in every particular. The figures given are averages of 20 bursts.

TABLE I.—BURST TESTS

Instrument Gauge	Mullen (Motor-Driven) (1) 6 inch Precision 0-160 Pounds	Mullen 0-20 Pounds	Mullen 0-40 Pounds	Mullen 0-150 Pounds	Schopper Dalen (2) 6 inch Precision 0-160 Pounds
M. F. book	6.5*	9.0	9.8*	8.4*	8.8*
Blotter (3)	8.2*	16.0*	17.8	15.8*	16.7*
Coated cover	17.1*	...	25.0	24.3*	22.0*
Sulphite bond (3)	18.1*	...	26.7	26.2*	24.8*
Blotter (heavy)	23.6*	...	32.1*	30.9*	32.5*
25 per cent rag bond	25.0*	...	33.5*	32.0*	30.0*
Sulphite ledger	31.0*	...	...	38.0	37.5*
50 per cent rag bond	35.2*	...	...	40.2	36.7*
50 per cent rag ledger	50.8	...	...	55.3	51.3*
100 per cent rag ledger	86.5	...	...	90.0	87.5*
Tympan	89.7	...	...	93.5	79.0*
100 per cent rag index	113.1	...	...	114.9	109.5*

* Not in accordance with T 403 m, which allows the use of only the middle half of any gauge even though calibrated.
(1) All four gauges were fitted on a Mullen tester and accurately calibrated against each other in position and corrections, which were quite small, applied.
(2) Uniform increase in pressure with this instrument, giving a burst in 2 seconds or 1/60th of bursting pressure in pounds per square inch.
(3) Note the large effect of gauge inertia on this paper.

From Table I it will be noticed that unless a specification is drafted to cover the inertia or other qualities of the gauge used, very large errors may be encountered. It is unfortunate that a 6 inch precision gauge having a lower range than 0 to 160 pounds was not available. While many of the tests in the "6 inch, 0 to 160 pounds" and the "Mullen 0 to 150 pounds" gauge columns are not according to standard T 403 m, at the same time, they are comparable with each other and show potential errors if the inertia factor of the gauges is omitted, especially with soft papers. This is contrary to the conclusions of Lofton *(1)*, who, however, only investigated inertia changes on the Mullen gauges alone.

Why the upper and lower quarters of carefully calibrated gauges (i.e., 50 per cent of the gauge), were not admitted to the present method, is somewhat obscure except as an indirect attempt to limit the time taken for the burst to be completed. The whole of the gauge may be used in the proposed method.

If different gauges were used with the suggested method (uniform application of the load to break in 2 seconds, or one-thirtieth of bursting pressure if it is over 60 pounds), the inertia of the gauge has been shown to have no effect *(2)*. In the same reference it is indicated that the relation between the standard and proposed methods on the papers tested is somewhat different than as given in Table I. This is ascribed to differences in the Mullen motor-driven testers used. Model A was used for the results given in the reference and Model B for the present results.

* To be presented at the annual meeting of the Technical Association of the Pulp and Paper Industry, Waldorf-Astoria Hotel, New York, N. Y., Feb. 17 to 20, 1936.
[1] Member TAPPI, Scott Paper Company, Chester, Pa.

Conversion Factors Unnecessary

It is concluded that results made according to the proposed test and the present TAPPI method are no further apart than with different models and gauges of Mullen testers in common use. Accordingly it would seem unnecessary to use any conversion formula such as proposed in the "Report of the Sub-Committee on Physical Tests of Paper" to the February, 1934, meeting of TAPPI.

The provision of a rounded edge having a radius of 0.025 inch, to the upper clamp is for a two-fold purpose. First, to prevent shear breaks as sometimes occur with a weak short-fibred sheet, especially with pulp testing, and secondly, to more nearly simulate the original Mullen upper clamp which was covered with a high density rubber having an orifice of 1.250 inches, which, when compressed, was in effect reduced to 1.200 inches with the .025 inch radius. The Schopper tests reported were made with a steel clamp machined to these dimensions.

It is to be noted that the proposed test can be accurately carried out on the present hand-driven Mullen tester. It is also expected that the makers would produce a suitable motor-driven one for new users were this test adopted. The Schopper-Dalen tester which is at present available, is admirably suited for the proposed test, but again it should be understood that unless for precision work such as pulp testing, the present method of using the Mullen testers is near enough to the proposed standard for most practical purposes. Indeed not much larger differences exist between the present TAPPI standard test and the new one proposed, than exist between different Mullen testers in different laboratories. This is indicated in Table II.

TABLE II.—COOPERATIVE BURST TESTS

Sample	D	E	F	G	Instr. and dia. orifice	
Laboratory A	39.5	15.0	20.1	9.9*	M.D.M.[1]	1.19"
Laboratory B	37.2	14.7	20.7	7.1	M.D.M.	1.25"
Laboratory C	42.0*	15.7	25.8*	6.4*	H.D.M.[2]	1.19"
Laboratory D	(33.6)	(14.9)	(19.4)	(7.9)	Schopper	1.20"
Laboratory E	35.8*	13.9*	19.7*	7.5	M.D.M.	1.25"[3]
Laboratory F[4]	40.5	18.0	23.2	...	M.D.M.	1.19"
Laboratory G	38.5	16.5*	21.5	7.0	M.D.M.	1.25"
Laboratory H[5]	(35.6)	(14.5)	(19.9)	(7.3)	Schopper	1.20"
Average	38.8	15.5	21.8	7.6	lbs./in.[2]	
Percent Difference +	8	6	18	30		
Percent Difference —	8	17	9	16		

[1] M.D.M. Motor Driven Mullen.
[2] H.D.M. Hand Driven Mullen.
[3] Hard Rubber Clamp.
[4] Bursting and Thickness Tests at 71 deg. F. 42 per cent r.h.
[5] Tests made on speciments from different sample sheets in Laboratory D by different operator.
* Indicates highest and lowest results.
( ) Results not included in average.

From Table II, which is a result of cooperative tests made by the leading laboratories in the United States and Canada (The Institute of Paper Chemistry; A. D. Little, Inc.; Forest Products Laboratory, Madison; Forest Products Laboratories, Montreal; U. S. Government Printing Office, etc.) show the large differences which are to be expected with the present TAPPI method even under the best conditions, and also show that the range between the highest and the lowest of the Mullen figures for all practical purposes, include the figures obtained according to the proposed method.

Additional References

The following two articles on the subject are also of interest: Underhay *(3)* shows that the effect of the quality

of diaphragm rubber may cause a difference of from 0.5 to 3.5 pounds. It is also shown that with a method similar to that proposed, the variations between the minimum and maximum individual readings on kraft paper were 21.3 per cent, whereas with the Mullen test done according to the present TAPPI procedure, they were 28.5 per cent. Oliver *(4)* shows that a difference of 1.8 per cent in results may be caused by an air bubble in the Mullen tester and, using water in place of glycerine, differences of from 0.3 to 4.4 per cent were noted (probably also due to air inclusion).

Tensile and Stretch Tests

The present TAPPI method with a given speed of the stressing jaw, limits the scale to over 10 per cent and under 90 per cent of its total capacity, and permits the use of different pendulum weights. It is obvious that a range of 9:1 is allowed in the rate of application of the load. As the leverage of the pendulum is also not specified, if this factor varies, the range of the rate of application of the load may easily be 20:1. While for many kinds of paper tested, even this enormous range of the rate of stressing the paper samples does not cause significant changes, a much lesser ratio may sometimes cause significant changes for certain papers, especially in pulp testing. Table III gives an example for a sulphite ledger paper.

TABLE III.—RATE OF LOADING ON TENSILE & STRETCH

Direction	No. of Tests made	Time to Test, (Secs.)	Tensile			Per cent Stretch		
			High	Low	Avg.	High	Low	Avg.
M/C	21	30	17.2	14.8	16.30	2.3	1.6	2.00
M/C	28	6	18.3	14.5	16.80	2.4	1.6	2.10
Cross	21	30	8.2	7.1	7.81	8.2	4.8	6.63
Cross	26	4	9.3	7.3	8.38	8.4	5.1	6.88

Note that in the machine direction, the increase in tensile and stretch with lighter speeds are respectively 3.1 and 5.0 per cent and in the cross direction 7.3 and 3.8 per cent.

A number of similar observations are given in Oliver's paper *(4)* already referred to, and also in the discussion of that paper where it is shown that with a constant jaw speed, the use of a large weight on the pendulum in place of the smaller weight, gave the following percentage increases in the tensile test results:

Bond	0.28 per cent
Sulphate Printing	3.7 per cent
Newsprint	8.0 per cent

With 1 inch wide and 15 mm wide strips under the same rate of loading, differences in the tensile results of from 1.5 per cent to 11.3 per cent were noted with different papers.

Cooperative Test Results

Table IV shows the result of a cooperative test on samples of paper for tensile and stretch tests made by the same laboratories referred to, with a request to follow the proposed method. The results are interesting, as, notwithstanding the request (apparently because tensile testing was such a routine matter), due attention to the new proposals was not exercised in some cases, which led to erroneous results. Laboratory B did not calibrate its apparatus and did not use proper humidity control. Laboratory C failed to calibrate its apparatus and obtained results which were very high in tensile and low on stretch. A second test after calibration, was much more satisfactory. Laboratory D repeated its tests with a different operator on new samples with a good check result. Laboratory E failed to calibrate its stretch apparatus and were far off. A repeat test was satisfactory. Laboratory F did not pay attention to the request to break the strip in from 10 to 20 seconds and ran its tests at a high constant rate of speed and, as was to be expected, obtained relatively high tests. Laboratory G used a half length strip and accordingly, obtained relatively high results. It is interesting to note that laboratories A, D and I, who did pay attention to the new method, obtained results which agreed very satisfactorily.

As a result of gathering this data, it is recommended that for good results, the strip be 180 mm long, 15 mm wide and that the time to break the strip be from 10 to 30 seconds, but for precise work the time should be as near to 20 seconds as practicable if there is doubt about the effect of speed.

General

It should be noted that the new tests for burst, tensile and stretch do not constrain anyone to use or procure new apparatus. The proposed standard burst tests may be carried out on a hand-driven Mullen and the proposed standard tensile test on any tensile tester by varying the speed of the jaw, or, if no better way is available, even

TABLE IV.—COOPERATIVE TENSILE AND STRETCH TESTS

Lab.	Tensile D MD	Tensile D CD	Tensile E MD	Tensile E CD	Tensile F MD	Tensile F CD	Tensile G MD	Tensile G CD	Stretch D MD	Stretch D CD	Stretch E MD	Stretch E CD	Stretch F MD	Stretch F CD	Stretch G MD	Stretch G CD
A	8.22	4.41	4.38	1.93	5.72	2.26	1.13	0.89	2.1	4.9	1.6	2.7	1.9*	4.0*	23.0*	2.7
B	8.08*	4.11*	3.97*	1.83	5.15*	2.15	1.02*	0.76*	1.8	4.6	1.4	2.7	1.6	4.0	...	2.3*
C	9.55*	5.37*	4.85*	2.11*	6.33*	2.43*	1.19	1.05	(1.6*)	(4.1*)	(1.4*)	(1.8)	(1.4*)	(2.8)	...	(1.4)
(C)	(9.22)	(4.60)	...	...	...	...	...	...	(2.1)	...	...	...	...	...	...	...
D	8.75	5.21	4.38	1.93	5.45	2.34	1.18	0.94	1.8	5.3*	1.5	2.7	1.5	3.8	20.0*	2.4
(D)	(8.4)	(4.3)	...	...	...	...	...	...	(2.0)	(5.3)	...	...	...	...	...	...
E	8.63	4.46	4.14	1.77*	5.26	2.14*	1.07	0.87	(1.7)	(7.3)	(3.1)	(4.7)	(3.1)	(7.1)	(15.8)	(4.4)
(E)	(8.74)	(4.33)	...	...	...	...	...	...	(2.2)	(5.3)	...	...	...	...	...	...
F	9.26	5.08	4.60	2.07	5.85	2.30	1.24*	1.07*	2.1*	4.9	1.6	2.9	1.6	3.9*	21.3	2.8*
G	(9.8)	(5.5)	(5.1)	(2.3)	(5.8)	(2.4)	(1.3)	(1.0)	(2.3)	(5.3)	(2.9)	(2.9)	(2.3)	(3.6)	(24.5)	(3.8)
H	8.56	5.1	4.0	1.97	5.35	2.23	1.12	0.90	(2.0)	(5.3)	(1.7)	(3.2)	(1.7)	(4.3)	(21.6)	(3.0)
I	8.29	4.72	4.32	1.84	5.25	2.13	1.22	0.83	2.3	5.7	1.7	2.3	1.5	4.3	21.0	2.5
Avg.	8.67	4.81	4.32	1.93	5.55	2.25	1.14	0.92	2.0	5.1	1.6	2.7	1.6	4.0	21.3	2.5
Percentage Range of results ...+	10	10	10	9	12	11	10	14	10	10	14	5	19	3	7	12
—	7	15	8	9	10	6	10	22	16	14	7	2	12	3	7	10

REMARKS:

Lab. A Time 6.8—26 secs.	No calibration errors reported.
Lab. B Time 10 —22 secs.	Instrument not calibrated—Tests were not repeated.
Lab. C Time 7 —29 secs.	Instrument calibrated—No corrections.
(C) C Repeat on new Sample	
Lab. D Time 14—20 secs.	Instrument calibrated—No corrections.
(D) D Repeat on new Sample	
Lab. E Time 16—21 secs.	Instrument calibrated—0.05 to + 0.02 kg. tensile — .03 to + .02% stretch.
(E) E Repeat on new Sample	
Lab. F Not timed—Constant and high jaw speed	No calibration errors reported.
Lab. G Time 12—32 secs.	94.5 mm. (half length) strip, calibration errors 0 to + 0.3 kgs. tensile + 0.3 to + 0.5 stretch.
Lab. H Time 15—25 secs.	Lab. D. Instrument calibrated—no correction. Samples from same paper but not from same sheets. (Different operator from D).
Lab. I Time 14—16 secs.	Calibrated.

In above cooperative test except for (H) one strip was cut off each of 12 sheets for each set of samples.

* Marks highest and lowest of average results. ( ) Indicates result not included in average.

by wedging the pendulum weights at different heights on the pendulum. In public or large laboratories, where many kinds of paper are tested, it would be preferable to get the desired conditions with a variable speed motor or variable speed gear drive. In mill laboratories for any given type of paper, once the standard test is known then *any* convenient method or apparatus may be used and then, and only if desired for precision work, a small constant correction factor may be applied. Furthermore, with the tensile and stretch tests, by setting the speed of the stressing jaw such that the average tensile break normally obtained occurs in about 20 seconds, a range of 50 per cent above and below the average readings will fall within the proposed standard, that is, a possible two-thirds of the entire range of both the heavy and the lightweight scales will simultaneously be within the proposed standard conditions. The new methods provide definite standards of reference for those who need them for example for pulp testing work and for particular specifications.

It is interesting to note that since these new methods have been proposed, they have been tentatively adopted as German standards by the Verein der Zellstoff and Papier Chemiker and Ingenieure. Furthermore, as a result of correspondence, it is also believed that the new suggestions will be favorably received in Canada and possibly in Great Britain and Scandinavian countries, which to date have not been agreeable to officially adopting the present TAPPI methods for these properties.

There can be no question as to the value of agreed International standard methods as long as pulp and paper remain articles of International commerce.

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(1) Lofton, R. E. and Costello, C. J., "Effect of the Weight of the Needle of the Mullen Paper Tester," *Tech. Asso. Papers*, VII, 23 (1924).
(2) Clark, James d'A., "Determining the Bursting Strength of Paper," *Paper Trade J.*, 93, No. 19, 37-40 (Nov. 5, 1931).
(3) Underhay, G. F., "Bursting Tester Standardization," *P. M. A. Proceedings*, Vol. XI, part 2, (March, 1931).
(4) Oliver, C. V., "Variability in Results Met With in Paper Testing," *P. M. A. Proceedings*, Vol. XI, part 1, (Oct., 1930).

Waste Liquors and Gases of the Paper Industry

A Survey of Recent Domestic and Foreign Patent Literature on the Utilization of Waste Liquor and Waste Gases of the Pulp Industry, 1931-1935

(Third Compilation.)

Clarence J. West, Chairman, Committee on Abstracts and Bibliography, TAPPI

(Continued from the issue of January 2, 1936)

Swedish Patents (continued)

75,456. JULY 16, 1929. *See* German Patent 557,445.

75,490. JAN. 22, 1929. *See* German Patent 549,783.

1257. 75,509. OCT. 11, 1932. AKTIEBOLAGET KARLSTADS MEKANISKA VERKSTAD. EVAPORATING SULPHITE OR SULPHATE CELLULOSE WASTE LIQUOR.

The liquor is mixed with a suitable solid filling material and evaporated in a rotary drum by means of hot air or smoke gas applied through openings in the walls of the drum. The solid material present in the drum, consisting of the said combustible filling material, together with solid matter formed by the evaporation of the liquor in continuous circulation, is discharged from the drum and after separation of a part corresponding to the amount of dry matter formed by evaporation of the liquor the remainder is returned to the furnace.

1258. 75,723. AUG. 21, 1929. HERNÖSANDS VERKSTADS OCH VARV A.B. FEED ARRANGEMENTS ON ROTATING OVENS FOR CALCINED MATERIAL.

75,724. FEB. 6, 1931. *See* German Patent 529,099.

1259. 75,847. DEC. 4, 1931. PATENTAKTIEBOLAGET GRÖNDAL-RAMÉN. PROCESS FOR THE MANUFACTURE OF ALKALI SULPHITE OR BISULPHITE SOLUTIONS FROM PULP WASTE LIQUORS CONTAINING ALKALI SULPHUR COMPOUNDS.

The organic constituents of the waste liquor are burned and the remaining sulphide and thiosulphate converted into sulphite and sulphate. A part of the residue from the combustion freed from sulphides and thiosulphates, and soluble in water, is treated with sulphur dioxide and calcium carbonate until the alkali salt present in the solution is wholly or for the greater part changed into bisulphite.

1260. 76,052. NOV. 30, 1929. PAPETERIES NAVARRE, SOC. AN. LYONS. PROCESS FOR THE MAKING OF FORMIC ACID AND THE RECOVERY OF SODIUM BY THE PURIFICATION OF WASTE LIQUORS CONTAINING PULP.

Treatment of the waste liquor with an acid exceeding formic acid in strength (or acid salt) and distillation of the mixture, whereby the formic acid is removed during the process and the sodium recovered in the form of sodium salts of the strong acid used.

1261. 76,200. JAN. 3, 1933. MOOCH DOMSJÖ AKTIEBOLAG. COOKING SULPHITE CELLULOSE.

The crude acid coming from the acid-preparation plant is circulated at normal temperature and pressure through an absorption apparatus where it is enriched in sulphur dioxide chiefly obtained from the waste gas (part of the sulphur dioxide may come from the digester), the gas being first cooled in a heat-exchanging apparatus. The enriched cold crude acid is made to pass under pressure through the heat-exchanger and in the preheated state is stored in a container, from which it is introduced into the digester.

1262. 77,548. AUG. 16, 1928. J. S. BATES. METHOD FOR THE PREPARATION OF PULP BY THE SULPHATE METHOD.

The so-called green liquor obtained by solution of the soda melt in water and addition of fresh sodium sulphate is allowed to settle and then filtered; the lime sludge obtained after causticizing is suitable for the preparation of sulphite cooking liquor.

77,736. JULY 1, 1929. *See* British Patent 317,040.

1263. 77,770. MAY 9, 1932. T. N. JÄSON APLER. METHOD FOR CAUSTICIZING CRUDE LIQUORS IN THE PULP MILL.

1264. 77,785. FEB. 25, 1931. THE DISTILLERS CO., LTD. PROCESS FOR THE AFTER TREATMENT OF CELLULOSE MATERIALS BY HYDROLYSIS UNDER THE ACTION OF DILUTE ACIDS, HEAT AND PRESSURE.

While the liquor is still warm and under pressure, it is heated further to 160 to 180 deg. C. for a short period in order to convert the non-fermentable saccharide constituents of the liquor into fermentable products.

1265. 77,894. APRIL 23, 1927. B. N. SEGERFELT. PROCESS FOR THE PREPARATION OF FRESH LIQUOR FROM THE WASTE LIQUOR OBTAINED THROUGH THE COOKING OF CELLU-

LOSE MATERIALS BY MEANS OF ALKALINE COOKING LIQUOR.

The melted soda obtained from the thickening and burning of the waste liquor is dissolved in a strong solution of sodium hydroxide but whose strength does not exceed 50 kilograms sodium hydroxide per cubic meter.

1266. 78,112. MARCH 17, 1930. ZELLSTOFFFABRIK WALDHOF & M. GADE, MANNHEIM. PROCESS FOR THE MANUFACTURE OF SULPHITE ALCOHOL.

1267. 78,171. AUG. 22, 1933. PATENTAKTIEBOLAGET GRÖNDAL-RAMÉN. EVAPORATING ALKALI SULPHITE LIQUORS.

The acid waste liquor obtained by the cooking of cellulose with alkali bisulphite is made neutral or alkaline by addition of the residue of fused salt obtained by evaporation and burning of the waste liquor from a previous cook, and it is then evaporated and burned, the residue all or in part being used for neutralizing new amounts of waste liquor.

1268. 78,493. SEPT. 26, 1933. HÖGANÄS-BILLESHOLMS. RECOVERY OF THE LIME USED IN CAUSTICIZING CELLULOSE COOKING LIQUOR.

The precipitate, chiefly consisting of calcium carbonate, obtained in cauticizing is brought into a suitable plastic consistency by drying or by addition of dry materials containing mainly calcium compounds and (or) combustible materials; the mass is formed into pieces, dried and burned.

1269. 78,693. JAN. 28, 1930. H. O. V. BERGSTRÖM AND K. N. CEDERQVIST. PROCESS FOR THE DISTILLATION OF TARS AND PITCH, OBTAINED AS BY-PRODUCTS IN THE MANUFACTURE OF SULPHATE PULP FROM SO-CALLED "FLOATING ROSIN," HYDROGENATION PRODUCTS AND OTHER PRODUCTS OBTAINED FROM WOOD.

1270. 79,078. APRIL 28, 1931. G. EDLING. DEVICE FOR SODA SMELTING OVEN FORMS.

System for cooling the oven.

1271. 79,384. JAN. 23, 1934. G. O. W. HEIJKENSKJOLD. FIXATION OF NITROGEN BY AZOTOBACTER.

Azotobacter is grown in a nutrient solution produced from sulphite cellulose waste liquor after removal of detrimental substances.

1272. 79,465. MARCH 10, 1931. H. N. UNDÉN. DEVICE FOR THE INTRODUCTION OF AIR TO SODA MELTING OVENS.

1273. 79,482. JUNE 17, 1929. METALLGESELLSCHAFT A. G., FRANKFURT A.M. PROCESS FOR THE REMOVAL OF GASEOUS CONTACT POISONS FROM OVEN GASES.

A scrubber tower is packed with materials which react with the contact poisons.

1274. 79,842. MARCH 13, 1934. G. HAGLUND. SULPHITE CELLULOSE.

In order to increase the content of organic matter in the waste liquor the liquid used for the second and final cooking is admixed with waste liquor or washings from previous charges.

1275. 79,974. SEPT. 14, 1929. B. H. O. de VERDIER. DEVICE FOR THE CONNECTION OF ONE OR MORE SODA SMELT OVENS TO A REVOLVING OVEN.

1276. 80,219. APRIL 24, 1934. C. F. KULLGREN. SULPHITE CELLULOSE.

The salt of lignosulphonic acid formed in the cellulose-containing material during cooking is converted into lignosulphonic acid by washing with one or more acids until the metal ions of the salt all or for the greater part have been replaced by hydrogen ions, after which the lignosulphonic acid is dissolved by heating the product with water under normal or increased pressure.

1277. 80,278. NOV. 11, 1930. A. HELLSTRÖM. DEVICE ON APPARATUS FOR CONVEYING IN CORD OR ROPE FORM, THE PRECIPITATED LIQUID ROSIN AS A BY-PRODUCT IN THE MANUFACTURE OF SULPHATE PULP.

The liquid rosin is conveyed by means of a screw, the trough of which is water cooled at the beginning and towards the other end it is air-cooled.

80,337. OCT. 17, 1932. *See* Norwegian Patent 53,417.

1278. 80,421. MARCH 5, 1930. H. BERGSTRÖM AND K. N. CEDERQVIST. PROCESS FOR THE REMOVAL OF THE EVIL-SMELLING MATERIALS FROM THE AQUEOUS CONDENSATE AND SOLUTIONS IN THE SULPHATE PULP PROCESS.

The condensate is led through a tower, column or wash apparatus with packing material where it comes in contact with the action of air or flue gases or a mixture of both.

1279. 80,570. FEB. 8, 1932. DEUTSCHE LINEOLEUMWERKE A.-G. PROCESS FOR THE MANUFACTURE OF MATERIAL FROM PINE OIL FOR FLOOR AND WALL COVERING.

The pine oil separating out as a by-product in the manufacture of sulphate pulp is used wholly or partially as a substitute for the usual starting product (drying oil and rosin). The pine oil is mixed with a siccative at high temperatures and is oxydized by blowing air through it, then after the addition of fillers and color the resulting product is brought into the desired form by pressing or rolling.

1280. 80,882. JUNE 30, 1932. GUY C. HOWARD AND C. HARMON. METHOD FOR THE PREPARATION OF A DISPERSION OF LIGNIN SUBSTANCES IN WATER.

The lignin compound, in solid form as a lignosulphonic acid, which is practically free from the non-lignin materials occurring in wood, is treated with a bisulphite solution until a dispersed state results.

1281. 80,900. JULY 10, 1934. E. PYHÄLÄ. REFINING AND DECOLORIZING SULPHATE SOAP.

The solution containing about 50 per cent of crude sulphate soap (obtained as a by-product in the manufacture of sulphate cellulose) is treated cold or hot with peroxides in amounts about 2.5 per cent of the soap quantity, for instance in the form of a 30 per cent solution of hydrogen peroxide, and the treated soap is salted out and separated from the mother liquor containing the impurities.

1282. 80,941. MARCH 22, 1928. H. SANDQVIST AND T. O. H. LINDSTRÖM. PROCESS FOR THE RECOVERY OF PHYTOSTERIN, FATTY AND RESINIC ACIDS OBTAINED FROM THE RAW SULPHATE SOAP AS BY-PRODUCT IN THE MANUFACTURE OF SULPHATE PULP.

The dried or highly concentrated soap is extracted with a suitable solvent in which phytosterin and the unsaponifiable material are soluble. The impurities are removed with sodium hydroxide, the solvent distilled off and the residue recrystallized with alcohol for the purpose of obtaining pure phytosterin.

1283. 81,898. NOV. 24, 1930. H. O. V. BERGSTRÖM AND K. N. CEDERQVIST. METHOD FOR CONTINUOUS DISTILLATION OF LIQUID ROSIN AND OILS OBRAINED AS BY-PRODUCTS IN THE SULPHATE PULP PROCESS.

1284. 82,000. AUG. 5, 1930. L. GLÖERSEN. CONNECTION OF THE SODA MELTING OVEN WITH THE REVOLVING OVEN.

1285. 82,372. DEC. 29, 1931. H. O. V. BERGSTRÖM AND K. N. CEDERQVIST. METHOD FOR OBTAINING ROSIN FROM SO-CALLED LIQUID ROSIN OR ITS DISTILLATE.

The crystalline rosin acids are separated from the liquid products by centrifuging and washed with water, methyl alcohol or other solvents.

1286. 82,448. MARCH 1, 1934. N. A. F. LIDVALL. METHOD OF PREPARING A BINDING AGENT FROM THE SULPHATE OIL OR SULPHATE PITCH, A BY-PRODUCT OF THE SULPHATE PROCESS.

The oil or pitch is mixed with cement.

82,808. DEC. 20, 1929. *See* United States Patent 1,779,536.

83,292. DEC. 20, 1926. *See* German Patent 519,694.

1287. 83,293. May 26, 1933. F. I. F. Gothner and G. J. W. Sandstrom. Method for complete or partial removal of black liquor from so-called sulphate soap.

Norwegian Patents

1288. 45,641. June 24, 1929. Einar Morterud. Cooking cellulose.

The charge of raw chips after being introduced into the digester is swelled by application of hot or superheated liquid, preferably water or used cooking liquor, which is afterward tapped off. The pressure in the digester is reduced before or during the following introduction of the boiling liquid.

1289. 47,526. March 27, 1926. A. Bol. Bästa. Process for the manufacture of yeast from sulphite waste liquor, or from other sugar solutions obtained from wood.

The deposited yeast is evolved in a solution with higher sugar content than the solution of waste liquor into which it is then added where it is brought to further development. After the beginning of the formation, wholly or partially neutralized sulphite waste liquor is added in portions or continuously; whereupon the yeast obtained is washed and separated.

1290. 47,843. Aug. 17, 1929. H. Pauly and K. Feuerstein. Vanillin.

Waste liquors, lignin and carbonized vegetable fibers or their transformation products on oxidation with a slight excess of oxidizing agent yield vanillin.

1291. 48,006. March 11, 1929. C. H. Michelson. Process for the preparation of fat and resinic acid from the residue of the floating so-called "soft soap" obtained as a by-product in the manufacture of sulphate or soda pulp.

The soap is treated with sulphite waste liquor and the fats and residue liberated is separated from the liquor.

1292. 48,720. Jan. 10, 1929. Guy C. Howard. Method of preparing lignin compounds from sulphite waste liquors.

The sulphite waste liquor is treated with solid calcium oxide or hydroxide. After the first precipitate is removed, further lime is added until these separates a yellow precipitate of lignin compounds; this is filtered off and lime added the third time to precipitate the remainder of the ligneous materials present.

49,648. Nov. 9, 1931. *See* United States Patent 1,799,535.

49,709. June 24, 1929. *See* British Patent 317,040.

1293. 49,914. Jan. 4, 1930. Liljeholmens Stearinfabrik A. Bol. Process for the separation of fatty and resinic acids as by-products from the precipitated floating rosin in the manufacture of sulphate pulp.

The separation is carried out by the esterification of the fatty acids by means of alcohol and the ester and resinic acids are removed by distillation. An alcohol such as glycerin is used which gives with the fatty acid ester such a high-cooking point that this does not in any appreciable amount contaminate the resinic acids distilling over but remains back in the distillation apparatus.

1294. 50,238. July 3, 1930. E. L. Rinman. Process for the manufacture of valuable products from vegetable materials.

The vegetable material is first cooked with an aqueous solution of barium or strontium hydroxide or a mixture of both and the remaining liquor is neutralized to precipitate certain chemicals and evaporated and finally subjected to destructive distillation.

1295. 50,486. April 4, 1932. Martin Hovde. Insecticide and fungicide.

A sulphur compound, preferably on alkali sulphide, is dissolved in a saponified resin solution obtained from sulphite cellulose waste liquor.

50,937. Aug. 12, 1929. *See* German Patent 553,967.

51,220. June 24, 1930. *See* British Patent 354,951.

51,472. Dec. 27, 1929. *See* German Patent 549,783.

51,704. April 1, 1931. *See* Swedish Patent 72,229.

1296. 51,837. Oct. 21, 1930. Bror H. Olof de Verdier. Device for the connection of one or more soda smelt ovens to a revolving oven.

1297. 52,218. Jan. 27, 1931. I. G. Farbenindustrie A. G., Frankfurt A. M. Process for the manufacture of fertilizer from pulp waste liquors.

The waste liquor obtained from the cooking of pulp with acids, especially sulphurous acid, nitric acid and chloric acid or acid ammonium salts such as ammonium bisulphite, is treated with an excess of ammonia under pressure and heat, and in case air or oxygen is introduced, so that there is practically no formation of carbonaceous precipitate.

1298. 52,373. Nov. 20, 1930. H. Scholler. Process for the fermentation of glucose solution obtained from materials containing cellulose for the production of alcohol.

Sulphurous acid in the form of salts or in the free form is added to the solution to be fermented and the fermentation takes place in the presence of phosphoric acid and nitrogenous compounds.

1299. 52,570. May 16, 1929. Industrikemiska A. Bol., Stockholm. Process for the evaporation of water or other liquids.

The process works on the multiple effect evaporation principle with nearly the same pressure throughout the entire apparatus and a mixture of air or other non-condensable gas or mixture of gases with condensing steam is used as the heating means. The operation is carried out so that the air or other non-condensable gas is led over the surface of the liquid.

52,640. May 28, 1930. *See* German Patent 572,850.

52,731. Dec. 14, 1931. *See* Swedish Patent 75,847.

1300. 52,815. Oct. 28, 1932. A. Hellström. Process for the preparation of "soft soap" in rope or piece form from so-called "floating rosin" as a by-product in the manufacture of sulphate pulp.

The liquid which is still warm is kneaded with calcined soda for the removal of the water, then cooled and pressed. In order to obtain a superior product, the mass is strongly cooled, so that it is solid through and through.

1301. 52,889. Feb. 25, 1931. The Distillers Co., Ltd., Edinburgh. Process for the saccharification of materials containing cellulose.

The liquor, obtained by the hydrolysis of materials containing cellulose by means of dilute acids with heat and pressure, is given an after-treatment which consists of an after-hydrolysis in order to change the non-fermentable poly-saccharides into fermentable substances.

53,005. April 21, 1928. *See* German Patent 558,705.

53,012. Nov. 6, 1930. *See* Finnish Patent 15,059.

1302. 53,060. Sept 18, 1933. Aktieselskabet Toten Cell osefabrik. Molded from coagulated sulphite cellulose waste liquor.

The coagulation is brought about by means of chromic acid or other oxidizers which are stirred into the mass immediately before or after the introduction of the mass into the molds.

(To be concluded)

IMPORTS OF PAPER AND PAPER STOCK

NEW YORK, BOSTON, PHILADELPHIA AND OTHER PORTS

NEW YORK IMPORTS

WEEK ENDING JANUARY 4, 1936

WALL PAPER

W. H. S. Lloyd & Co., Spaarndam, Rotterdam, 2 cs.; ———, Argosy, Wallvik, 10 bxs.; Globe Shipping Co., New York, Hamburg, 8 rolls; ———, New York, Bremen, 15 cs; W. H. S. Lloyd & Co., American Merchant, London, 20 bls., 1 cs.; ———, American Merchant, London, 2 bls.

WALL BOARD

———, Argosy, Wallvik, 279 bdls.

NEWSPRINT

Perkins Goodwin & Co., New York, Hamburg, 562 rolls; Jay Madden Corp., New York, Bremen, 130 rolls; ———, Norefjord, Oslo, 1076 rolls; ———, Norefjord, Oslo, 7 bls.; International Paper Co., Cornerbrook, Dalhousie, 7660 rolls; Brooklyn Daily Times, Rydboholm, Gothenburg, 233 rolls.

PRINTING PAPER

Senefelder Co., New York, Hamburg, 22 cs.

WRAPPING PAPER

Globe Shipping Co., New York, Hamburg, 76 rolls; E. Dietzgen & Co., New York, Bremen, 49 cs.; F. C. Strype, Black Falcon, Antwerp, 6 bls.; Chase National Bank, Rydoholm, Halmstad, 1790 rolls.

DRAWING PAPER

Devoe & Raynolds Co., American Merchant, London, 2 cs.; Winsor Newton, Inc., American Merchant, London, 3 cs.

FILTER PAPER

H. Reeve Angel & Co., Inc., American Merchant, London, 8 cs.

FILTER COMPOUND

J. Manheimer, Spaarndam, Rotterdam, 25 bls.; Gerhard & Hey, Spaarndam, Rotterdam, 80 cs.

BARYTA COATED PAPER

Globe Shipping Co., New York, Bremen, 144 cs.

SURFACE COATED PAPER

Hensel Bruckman & Lorbacher, New York, Hamburg, 14 cs.; C. Happel, New York, Hamburg, 18 cs.; Globe Shipping Co., New York, Hamburg, 1 cs.; Gevaert Co. of America, Black Falcon, Antwerp, 56 cs.

METAL COATED PAPER

K. Pauli Co., New York, Bremen, 15 cs.

DECALCOMANIA PAPER

B. F. Drakenfeld & Co., Andania, Liverpool, 23 cs. (duplex).

DECALCOMANIAS

Sellers Transportation Co., New York, Hamburg, 15 cs.; Sellers Transportation Co., New York, Bremen, 6 cs.

TISSUE PAPER

American Express Co., American Merchant, London, 1 cs.; B. F. Drakenfeld & Co., American Merchant, London, 4 cs.

COLORED PAPER

———, New York, Hamburg, 5 cs.

PATTERN PAPER

Japan Paper Co., American Merchant, London, 1 cs.

GREASEPROOF PAPER

Parsons & Whittemore, Inc., Rydboholm, Gothenburg, 242 rolls.

GUMMED PAPER

G. Gennert, New York, Hamburg, 7 cs.; ———, New York, Bremen, 2 cs.; S. S. Kresge, American Shipper, Liverpool, 4 cs.

PAPER TUBES

———, New York, Hamburg, 76 cs.

CARD BOARD

American Express Co., New York, Hamburg, 11 cs.; E. Fougera & Co., American Merchant, London, 6 cs.

STRAW BOARDS

———, Beemsterdyk, Rotterdam, 74 rolls.

MISCELLANEOUS PAPER

Jay Madden Corp., Argosy Helsingfors, 25 bbls.; Jay Madden Corp., New York, Bremen, 31 bbls.; Keuffel & Esser Co., New York, Hamburg, 27 cs., 33 rolls; Corp. Exchange Bank Trust Co., Kinai Maru, Kobe, 76 cs.; Defender Photo-Supply Co., Black Falcon, Antwerp, 2 cs.; Guaranty Trust Co., Rydboholm, Halmstad, 213 rolls; National Pulp & Paper Co., Inc., Rydboholm, Gothenburg, 1520 rolls; M. Sone, Rydboholm, Gothenburg, 471 bls.; E. H. Sergent & Co., Rydboholm, Gothenburg, 3 cs.

RAGS, BAGGING, ETC.

Van Oppen & Co., Beemsterdyk, Rotterdam, 67 bls. bagging; E. J. Keller Co., Inc., Beemsterdyk, ———, 49 bls. bagging; Great Eastern Packing & Paperstock Corp., Silverbeach, Bombay, 113 bls. rags; ———, J. Jadot, Antwerp, 210 bls. bagging; Banco Com'l Italiane Trust Co., J. Jadot, Antwerp, 80 bls. jute waste; ———, Andania, Liverpool, 44 bls. rags; ———, Gerolstein, Antwerp, 238 bls. bagging Royal Manfg. Co., Gerolstein, Antwerp, 186 bls. cotton waste; Royal Manfg. Co., American Shipper, Manchester, 100 bls. cotton waste; ———, Tonsbergfjord,

Barcelona, 90 bls. cotton waste; Bank of N. Y. Trust Co., Tonsbergfjord, Barcelona, 206 bls. dark cottons; ———, Spaarndam, Rotterdam, 11 bls. rags; J. J. Ryan & Sons, Spaarndam, Rotterdam, 64 bls. cotton waste; W. Steck & Co., Black Falcon, Antwerp, 39 bls. rags; J. J. Ryan Sons, Black Falcon, Antwerp, 150 bls. cotton waste; E. J. Keller Co., Inc., Black Falcon, ———, 189 bls. bagging.

BONE GLUE

———, New York, Hamburg, 400 bags.

OLD ROPE

Banco Com'l Italiane Trust Co., New York, Bremen, 54 coils; Banco Com'l Italiane Trust Co., American Merchant, London, 85 coils; Chase National Bank, American Merchant, London, 39 coils; Manufacturers Trust Co., American Merchant, London, 43 coils; W. Steck & Co., Beemsterdyk, Rotterdam, 102 coils; W. Steck & Co., Spaarndam, Rotterdam, 123 coils.

CHINA CLAY

E. Fougera & Co., American Merchant, London, 22 casks.

CASEIN

American British Chemical Supplies, Coldbrook, Buenos Aires, 417 bags, 25020 kilos; American British Chemical Supplies, Pan America, Buenos Aires, 417 bags.

WOOD PULP

E. M. Sergeant Pulp & Chemical Co., Inc., Idefjord, Oslo, 960 bls. chemical pulp; Price & Pierce, Ltd., Idefjord, Oslo, 300 bls. sulphite; Perkins Goodwin & Co., Idefjord, Drammen, 1000 bls. sulphite; Irving Trust Co., Idefjord, Drammen, 2800 bls. sulphite; Irving Trust Co., Idefjord, Drammen, 500 bls. chemical pulp; Chase National Bank, Idefjord, Tofte, 150 bls. sulphite; Atterbury Bros., Inc., Idefjord, Tofte, 2250 bls. sulphite; The Borregaard Co., Inc., Idefjord, Sarpsborg, 300 bls. sulphate; J. Anderson & Co., Idefjord, Sarpsborg, 3375 bls. sulphite; Price & Pierce, Ltd., Idefjord, Sarpsborg, 3500 bls. sulphite; ———, Idefjord, Sarpsborg, 300 bls. sulphite; M. Sone, Argosy, Stockholm, 450 bls. sulphite, 76 tons; M. Sone, Argosy, Ulfvik, 5460 bls. mechanical pulp, 910 tons; ———, Argosy, Hernosand, 6818 bls. mechanical, 1136 tons; Price & Pierce, Ltd., Argosy, Hernosand, 3000 bls. sulphate, 500 tons; Price & Pierce, Ltd., Argosy, Wallvik, 1200 bls. sulphite, 200 tons; Price & Pierce, Ltd., Argosy, Wallvik, 125 bls. mechanical, 25 tons; Johaneson Wales & Sparre, Inc., Argosy, Gdynia, 672 bls. wood pulp, 101 tons; Gottesman & Co., Inc., Argosy, Gdynia, 648 bls. wood pulp, 100 tons; Perkins Goodwin & Co., Argosy, Gdynia, 324 bls. wood pulp, 50 tons; ———, New York, Hamburg, 1672 bls. wood pulp, 250 tons; Bulkley Dunton & Co., Beemsterdyk, ———, 727 bls. wood pulp; Bulkley Dunton & Co., Simon von Utrecht, ———, 5390 bls. sulphite, 915 tons; Atterbury Bros., Inc., Simon von Utrecht, Sundsvall, 1200 bls. mechanical, 200 tons; Johaneson Wales & Sparre, Inc., Simon von Utrecht, Sundsvall, 600 bls. sulphite, 100 tons; Johaneson Wales & Sparre, Inc., Simon von Utrecht, Sundsvall, 1250 bls. chemical pulp, 250 tons; E. M. Sergeant Pulp & Chemical Co., Inc., Norefjord, Oslo, 150 bls. chemical pulp; The Borregaard Co., Inc., Norefjord, Sarpsborg, 908 bls. sulphate; Price & Pierce, Ltd., Rydboholm, Gothenburg, 1000 bls. wood pulp; J. Anderson & Co., Rydboholm, Gothenburg, 230 bls. sulphite; Johaneson Wales & Sparre, Inc., Rydboholm, Gothenburg, 100 bls. sulphate; Johaneson Wales & Sparre, Inc., Rydboholm, Gothenburg, 748 bls. kraft soda pulp; Gottesman & Co., Inc., Rydboholm, Gothenburg, 1600 bls. sulphite.

WOOD PULP BOARDS

Griffin Rutgers, Inc., New York, Hamburg, 166 pkgs.

ALBANY IMPORTS

WEEK ENDING JANUARY 4, 1936

Pagel Horton & Co., Inc., Virginia, Gefle, 16450 bls. sulphite, 1767 tons; Price & Pierce, Ltd., Virginia, Gefle, 3000 bls. sulphite, 508 tons; Gottesman & Co., Inc., Virginia, Gothenburg, 3537 bls. chemical pulp; Bank of N. Y. Trust Co., Simon von Utrecht Hernosand, 8400 bls. sulphate, 1400 tons; Bank of N. Y. Trust Co., Simon von Utrecht Hernosand, 3450 bls. sulphite, 575 tons; ———, Milos, Norrsundet, 9150 bls. sulphate, 2029 tons.

BOSTON IMPORTS

WEEK ENDING JANUARY 4, 1936

Pagel Horton & Co., Inc., Virginia, Gefle, 1830 bls. sulphite, 295 tons; Pagel Horton & Co., Inc., Virginia, Gefle, 125 bls. sulphite, 25 tons; Price & Pierce, Ltd., Virginia, Utansjo, 1826 bls. sulphite, 309 tons; Pagel Horton & Co., Inc., Virginia, Kopmanholman, 824 bls. sulphite; Brown Bros. Harriman & Co., Virginia, Kopmanholman, 1530 bls. chemical pulp; ———, American Merchant, London, 402 bls. waste paper; ———, American Merchant, London, 52 bls. rags; ———, Andania, Liverpool, 934 bags hide cuttings; F. S. Webster Inc., Andania, Liverpool, 9 cs. tissue paper; G. F. Malcolm, Inc., Andania, Liverpool, 22 cs. tissue paper; New England Waste Co., Tai Yang, Kobe, 250 bls. bagging; Bulkley Dunton & Co., Sorvard, ———, 3275 bls. wood pulp; E. J. Keller Co., Inc., Black Falcon, ———, 144 bls. bagging.

PORTLAND IMPORTS

WEEK ENDING JANUARY 4, 1936

J. Andersen & Co., Simon von Utrecht, Munksund, 6000 bls. sulphate, 1000 tons; ———, Simon von Utrecht, Hernosand, 1050 bls. sulphite, 175 tons; ———, Simon von Utrecht, Hernosand, 2820 bls. sulphate, 470 tons; Johaneson Wales & Sparre, Inc., Simon von Utrecht, Sundsvall, 1200 bls. sulphite, 200 tons; J. Anderson & Co., Simon von Utrecht, Sundsvall, 13380 bls. sulphate, 2230 tons; Bulkley Dunton & Co., Simon von Utrecht, ———, 3500 bls. wood pulp, 700 tons.

PHILADELPHIA IMPORTS

WEEK ENDING JANUARY 4, 1936

Price & Pierce, Ltd., Argosy, Wallvik, 2700 bls. sulphite, 450 tons; F. L. Smidth Co., Argosy, Copenhagen, 112 bls. paper bags.

BALTIMORE IMPORTS

WEEK ENDING JANUARY 4, 1936

J. Andersen & Co., Rydboholm, Halmstad, 3500 bls. sulphite; Gottesman & Co., Inc., Rydboholm, Halmstad, 2250 bls. sulphite; Perkins Goodwin & Co., Rydboholm, Gothenburg, 427 bls. sulphate; Perkins Goodwin & Co., Rydboholm, Gothenburg, 1270 bls. kraft pulp; Perkins Goodwin & Co., Rydboholm, Gothenburg, 2340 bls. sulphite; Johaneson Wales & Sparre, Inc., Rydboholm, Gothenburg, 1125 bls. sulphate; Johaneson Wales & Sparre, Inc., Rydboholm, Gothenburg, 700 bls. sulphite; Gottesman & Co., Inc., Helle, Sweden, 1480 bls. wood pulp.

NEWPORT NEWS IMPORTS

WEEK ENDING JANUARY 4, 1936

Johaneson Wales & Sparre, Inc., Rydboholm, Gothenburg, 2500 bls. sulphate; Gottesman & Co., Inc., Rydboholm, Gothenburg, 310 bls. chemical pulp; Gottesman & Co., Inc., Helle, Sweden, 575 bls. wood pulp.

NEW ORLEANS IMPORTS

WEEK ENDING JANUARY 4, 1936

M. Sone, Stureholm, Sundsvall, 100 bls. wood pulp.

New York Market Review

Office of the PAPER TRADE JOURNAL,
Wednesday, January 8, 1936.

Conditions in the local paper market are satisfactory. Demand for the various standard grades of paper is well sustained for the time of year. Sales forces of the leading paper organizations are generally optimistic over the future outlook. Prices are holding to previously quoted levels, in most instances.

The position of the newsprint paper market is gradually improving. Demand from the newspaper publishers is holding up well. Production in the United States, Canada and Newfoundland is being maintained in good volume. The recently announced increase of $1 per ton is now in force.

Business in the fine paper market is fairly brisk. Book, bond, cover and ledger papers are moving freely. Prices are steady to firm. Tissues continue in good request. The coarse paper market is displaying strength. Paper board mills are beginning to resume activities after the usual holiday lull.

Mechanical Pulp

No radical changes transpired in the ground wood pulp market. Manufacturing operations in North America and abroad are practically keyed to consumption, with the result that the statistical position of the industry is fairly sound. Prices are generally holding to schedule and reports of concessions are infrequent.

Chemical Pulp

The chemical pulp market is fairly buoyant. The various domestic and imported grades are decidedly firm, especially kraft pulp and bleached sulphite. Offerings of kraft pulp are limited and prices are rising. Foreign kraft pulp is now quoted at from $1.80 to $1.85, on dock, Atlantic Ports.

Old Rope and Bagging

Although the old rope market is rather quiet, the outlook for the future is fairly promising. Demand for domestic and imported old manila rope is restricted. Mixed strings are moderately active. The bagging market is firmer. Quotations on practically all grades of bagging are higher.

Rags

The domestic rag market is stronger. Demand for new cotton rags is persistent and prices have advanced, in some instances. No. 1 white shirt cuttings are in particularly good request, both for domestic and foreign consumption. Quotations on this grade are now from $7.50 to $7.75, f.o.b., New York.

Waste Paper

Steadiness prevails in the paper stock market. The lower grades of waste paper are beginning to attract more attention from the board mills, now the holidays and the inventory season are nearly ended. The higher grades of paper stock are firm, especially hard white envelope cuttings and hard and soft white shavings.

Twine

While trading in the local twine market has slowed down, the lull is less in evidence than usual at this time of the year. Supplies are moving into consumption at a fairly steady pace. The future outlook is considered encouraging, in most quarters. Recently advanced quotations are generally maintained.

F. C. Stamm with Armstrong Machine Works

F. C. Stamm, until recently, general superintendent of the Upson Company, Lockport, N. Y., has become associated with the Armstrong Machine Works, at Three Rivers, Mich. Mr. Stamm has been associated with the paper industry for over twenty years and much of this time has been devoted to the matter of drying paper. During the last five years he has taken a very active interest in the work of the Drying Committee of TAPPI and has presented many papers dealing with the subject.

The Armstrong Machine Works are well-known throughout the paper industry and have recently established a special paper mill department to handle the various paper mill specialties which they have developed. One of these specialties, is a moisture control for paper machines, it is already on the market and will be announced to the trade in the near future.

Organize Scangreaseproof

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., January 8, 1936—Manufacturers of greaseproof paper in Sweden, Norway and Finland, recently organized a cartel, to be known as "De Svenska, Norska och Finska Greaseproffabrikanternas Noteringsforening, according to Trade Commissioner Basil D. Dahl, Stockholm. The cartel has been organized primarily for the protection of the members' interests in foreign markets. The new organization, which will be commonly known as "Scangreaseproof," is quite similar to "Scankraft" established about three years ago. "Scangreaseproof" will have offices in Stockholm. Competition between members is to be limited and reduced to a minimum through apportioning and distributing sales. The membership comprises five or six Swedish manufacturers of greaseproof, four Norwegian and two Finnish concerns. Estimates place the total annual output of greaseproof paper in the three countries at around 65,000 metric tons.

Approved Pulp Testing Chemist

The Joint Committee on Approved Pulp Testing Chemists for the Paper Industry, announces that Nelson Hartnagel, Fibreboard Products, Inc., Port Angeles, Wash., has been accepted by the Committee as an approved mill pulp testing chemist and is listed as such, effective January 1, 1936.

Miscellaneous Markets

Office of the PAPER TRADE JOURNAL,
Wednesday, January 8, 1936.

BLANC FIXE.—The blanc fixe market is in a strong statistical position. Prices are holding to schedule. The pulp is quoted at $42.50 to $45 per ton, in bulk; while the powder is selling at 3½ to 3¾ cents per pound, in barrels, at works.

BLEACHING POWDER.—Steadiness prevails in the bleaching powder market. Demand is moderately active and contract shipments are moving in fairly good volume. Bleaching powder is still quoted at $2 to $2.25 per 100 pounds, in drums, at works.

CASEIN.—The casein market is firm. Domestic standard ground is quoted at 15 and finely ground at 15½; Argentine standard ground at 14¾ and finely ground at 15; French standard ground at 14½ and finely ground at 15 cents per pound, in bags, car lot quantities.

CAUSTIC SODA.—Supplies of caustic soda are moving into consumption freely. The prevailing demand is fairly persistent. Solid caustic soda is quoted at $2.55 to $2.60; while the flake and ground are selling at $2.95 to $3 per 100 pounds, at works.

CHINA CLAY.—The china clay market is exhibiting a strong undertone. Contract shipments are moving regularly. Imported china clay is quoted at $13.50 to $21 per ton, ship side; while domestic paper making clay is selling at $6.50 to $12 per ton, at mine.

CHLORINE.—Orders for chlorine are being booked in good volume for future delivery. The contract movement is seasonal. Prices are steady to firm. Chlorine is quoted at $2.15 to $2.55 per 100 pounds, in tanks, or multi-unit cars, at works.

ROSIN.—The rosin market is firmer. Paper making gum rosin is now quoted at $4.45 and wood rosin at $4.40 per 280 pounds, gross weight, in barrels, at Savannah. Seventy per cent rosin size, is selling at $2.57 per 100 pounds, in tank cars, at works.

SALT CAKE.—Conditions in the salt cake market are fairly satisfactory. Prices are holding to schedule. Salt cake is quoted at $12 to $13; chrome salt cake at $11 to $12 per ton, at works. Imported salt cake is selling at $12 to $13 per ton, ship side.

SODA ASH.—Contract agreements for 1936 are being booked freely in the soda ash market. Supplies are moving into consumption regularly. Quotations on soda ash, in car lots, at works, per 100 pounds, are as follows: in bulk, $1.05; in bags, $1.20; and in barrels, $1.50.

STARCH.—The position of the starch market is practically unchanged. Demand from the paper mills is fairly active. Prices are steady. Special paper making starch is quoted at $3.14 per 100 pounds, in bags; and at $3.41 per 100 pounds, in barrels, at works.

SULPHATE OF ALUMINA.—Demand for sulphate of alumina is normal for the season. Prices are holding to formerly quoted levels. Commercial grades are quoted at $1.35 to $1.50; and iron free at $1.90 to $2.05 per 100 pounds, in barrels, at works.

SULPHUR.—The sulphur market is steady. Sulphur is quoted at $18 per long ton on orders of 1,000 tons, or over, on yearly contracts; and at $20 per ton on any smaller quantity over that period. On spot and near by car loads, the quotation is $21 per ton.

TALC.—Most of the business transacted in the talc market during the past week was routine. Prices are steady and unchanged. Domestic talc is quoted at $16 to $18 per ton, at eastern mines; while imported talc is selling at $23 to $30 per ton, on dock.

Market Quotations

Paper

Rag Content Bond & Ledgers—Delivered Zone 1

	Bonds	Ledgers
100% Rag Ext. No. 1	.36	.37
100% Rag	.28	.29
75% Rag	.21	.22
65% Rag	.18	.19
50% Rag	.15	.16
25% Rag	.12½	.13½

Sulphite Bond & Ledgers—Delivered Zone 1

	Bonds	Ledgers
No. 1 Sulphite	7.75	8.75
No. 2 Sulphite	6.75	7.75
No. 3 Sulphite	6.00	7.00
No. 4 Sulphite	5.50	6.50

Book, Cased—		
S. & S. C.	5.35 @	5.75
S. & S. C. Litho.	5.60 @	6.00
M. F.	5.10 @	5.50
Coated and Enamel	5.90 @	6.55
Coated Litho	5.90 @	6.55
Tissues—Per Ream—		
White No. 1	.82½ @	—
White No. 1 M. G.	.77½ @	—
White No. 1½	.62½ @	—
White No. 2	.60 @	—
Anti-Tarnish M. G.	.67½ @	—
Colored	.80 @	—
Kraft	.67½ @	—
Manila	.60 @	—
Unbleached Toilet	2.60 @	3.30
Bleached Toilet	3.94 @	5.26
Paper Towels—		
Unbleached	2.10 @	3.35
Bleached	3.30 @	3.70
Manila—		
No. 1 Jute	9.00 @	9.25
No. 2 Jute	7.75 @	8.50
No. 1 Wood	4.00 @	5.25
No. 2 Wood	3.50 @	4.00
Fibre Papers—		
No. 1 Fibre	4.25 @	5.50
No. 2 Fibre	4.00 @	4.75

(Delivered New York)

News, per ton—		
Roll, contract	41.00 @	—
Sheets	46.00 @	—
Kraft—		
No. 1 Northern	4.12½ @	4.75
Standard	4.00 @	—
Southern	3.87½ @	—
Boards—per ton—		
News	37.50 @	—
Chip	37.50 @	—
Sgl. Mla. Ll. Chip	42.50 @	45.00
Jute Lined Chip	42.50 @	45.00
Kraft Liners	57.50 @	60.00
White Patent Coated	55.00 @	57.50
Binders Boards	67.00 @	75.00

Mechanical Pulp

(On Dock, Atlantic Ports)

No. 1 Imported—		
Moist	21.00 @	22.00
Dry	21.00 @	22.00

(F. o. b. Mill)

No. 1 Domestic and Canadian	18.00 @	24.00

Chemical Pulp

(On Dock, Atlantic, Gulf and west Coast Ports)

Bleached Sulphite (Domestic and Foreign)—		
Division 1	2.60 @	2.90
Division 2	2.55 @	—*
Division 3	2.50 @	—*
Prime Qualities—		
Class 1. All Prime Easy Bleaching	2.05 @	—*
Other Than Easy Bleaching—		
Class 2. Higher than Standard	2.00 @	—*
Class 3, Standard	1.95 @	—*
Class 4, Lower than Standard	1.90 @	—*

(On Dock, Atlantic Ports)

Kraft No. 1	1.80 @	1.85
Kraft No. 2	1.60 @	1.70

(F. o. b. Pulp Mill)

Kraft Domestic	1.75 @	1.80

(Delivered)

Soda Bleached	2.50 @	—

* Add 60 Cents per short ton, dock charges, for Albany; $2.00 for Lake Ports East and $3.00 for Lake Ports West of Mackinac Straits.

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—		
New White, No. 1	7.50 @	7.75
Silesias No. 1	5.00 @	5.25
New Unbleached	7.75 @	8.00
New Soft Blacks	3.75 @	4.00
Blue Overall	5.25 @	5.50
Fancy	2.50 @	2.75
Washables	1.90 @	2.15
Mixed Khaki Cuttings	3.25 @	3.50
O. D. Khaki Cuttings	4.00 @	4.25
Men's Corduroy	1.85 @	2.00
New Mixed Blacks	2.50 @	2.75

Old Rags

White, No. 1—		
Repacked	3.00 @	3.50
Miscellaneous	2.75 @	3.25
White, No. 2—		
Repacked	1.75 @	2.25
Miscellaneous	1.50 @	1.75
Thirds and Blues—		
Repacked	1.75 @	1.85
Miscellaneous	1.45 @	1.55
Roofing Rags—		
No. 1	1.55 @	1.60
No. 2	1.35 @	1.40
No. 3 (bagging)	1.00 @	1.05
No. 4	.95 @	1.00
No. 5A	.90 @	1.00

Foreign Rags

New Rags

New Dark Cuttings	2.00 @	2.25
New Mixed Cuttings	1.80 @	1.90
New Light Silesias	3.75 @	4.00
Light Flannelettes	4.00 @	4.25
New White Cuttings	6.50 @	6.75
New Light Oxfords	3.25 @	3.50
New Light Prints	2.75 @	3.00

Old Rags

No. 1 White Linens	7.50 @	8.00
No. 2 White Linens	6.50 @	7.00
No. 3 White Linens	4.50 @	5.00
No. 4 White Linens	2.25 @	2.50
No. 1 White Cotton	4.25 @	4.75
No. 2 White Cotton	3.25 @	3.75
No. 3 White Cotton	2.50 @	2.75
No. 4 White Cotton	1.90 @	2.15
Extra Light Prints	2.00 @	2.25
Ord. Light Prints	1.75 @	1.85
Med. Light Prints	1.55 @	1.65
Dutch Blue Cottons	2.00 @	2.25
French Blue Linens	2.30 @	2.40
German Blue Linens	2.15 @	2.25
German Blue Cottons	1.70 @	1.80
Checks and Blues	1.70 @	1.80
Linsey Garments	1.95 @	2.05
Dark Cottons	1.50 @	1.60
Old Shopperies	1.00 @	1.05
New Shopperies	1.25 @	1.35
French Blues	2.00 @	2.25

Old Rope and Bagging

(Prices to Mill f. o. b. N. Y.)

Gunny No. 1—		
Foreign	2.10 @	2.15
Domestic	2.20 @	2.20
Wool Tares, light	1.75 @	2.00
Wool Tares, heavy	2.25 @	2.30
Bright Bagging	1.75 @	1.80
Manila Rope—		
Foreign	2.10 @	2.15
Domestic	2.00 @	2.10
Mixed Strings	.85 @	1.00
New Burlap Cut	2.00 @	2.25
Hessian Jute Threads—		
Foreign	2.60 @	2.75
Domestic	2.80 @	3.00

Old Waste Papers

(F. o. b. New York)

Shavings—		
White Envelope Cuttings	2.45 @	2.55
Ordinary Hard White No. 1	2.10 @	2.15
Hard White No. 2	1.90 @	2.00
Soft White No. 1	1.80 @	1.90
Flat Stock—		
Stitchless	.65 @	.75
Over issue Mag	.65 @	.75
Solid Flat Book	.55 @	.60
Crumpled No. 1	.35 @	.40
Solid Book Ledger	1.50 @	1.65
Ledger Stock	.85 @	.90
New B. B. Chips	.30 @	.35
Manilas—		
New Env. Cut	1.70 @	1.80
New Cuttings	1.35 @	1.45
Bogus Wrapper	.40 @	.50
Old Kraft Machine—		
Compressed bales	1.10 @	1.20
News—		
No. 1 White News	1.45 @	1.50
Strictly Overissue	.50 @	.55
Strictly Folded	.32½ @	.35
No. 1 Mixed Paper	.25 @	.27½

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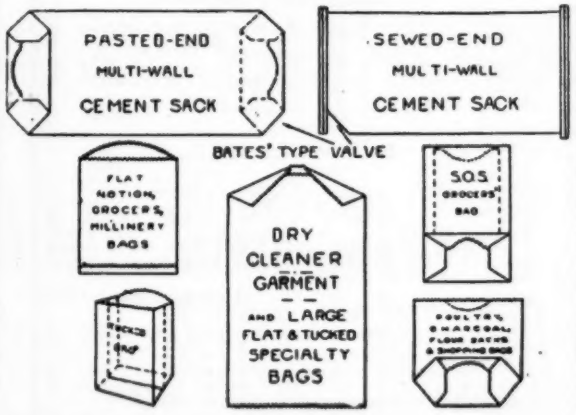
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Twines

(F. o. b. Mill)

(Soft Fibre)

Coarse Polished—

India	.13¼	@	.15¼
Belg. White Hemp	.14¼	@	.17¾
India Compress	.13¾	@	.14¼

Fine Polished—

Fine India	.21½	@	.23½
Special	.19½	@	.21½

Unpolished—

Box	.12	@	.12½
Paper Makers	.09	@	.13½
Tube Rope	.10	@	.15½
Wall Paper	.11	@	.14½
Wrapping	.15½	@	.21
Special	.15	@	.15½
Soft Fiber Rope	.12½	@	.12¾

(Hard Fibre)

Bond	.12	@	.20½
Anchor	.11½	@	.13
Manila	.21	@	.28

CHICAGO

Paper

(F. o. b. Mill)

Rag Bond	.12	@	.50
Water Marked Sulphite Bond	.06¼	@	.11
Sulphite Bond	.05½	@	.11
Superfine Writing	.18	@	.24
No. 1 M. F. Book	.06½	@	.07¾
No. 2 M. F. Book	.05¼	@	.06¼
No. 1 S.&S.C. Book	.06¾	@	.07¾
No. 2 S.&S.C. Book	.05¾	@	.06½
Coated Book	.07	@	.12
Coated Label	.07	@	.08½
No. 1 Manila	.04¾	@	.05¾
No. 1 Fibre	.04¾	@	.05¾
No. 2 Manila	.04¼	@	.04¾
Butcher's Manila	.03¼	@	.03¾
No. 1 Kraft	4.75	@	5.00
Southern Kraft	3.88	@	4.25
No. 2 Kraft	3.88	@	4.25
Wood Tag Boards	.04½	@	.06¼
Sulphite Screenings	.03	@	.03¼
Manila Tissue	.05¾	@	.07
White Tissue	.07	@	.09

(Delivered Central Territory)

News, per ton—			
Rolls, contract	41.00	@	—
Sheets, open	46.00	@	48.50
Boards, per ton—			
Plain Chip	46.50	@	—
Solid News	50.00	@	—
Manila Lined Chip	55.00	@	—
Patent Coated	65.00	@	—
Container Lined—			
85 Test, per 1000 sq. ft.			1.70
100 Test, per 1000 sq. ft.			1.85

Old Papers

(F. o. b. Chicago)

Shavings—

No. 1 White Envelope Cuttings	1.70	@	2.00
No. 1 Hard White	1.40	@	1.65
No. 1 Soft White	1.25	@	1.50
Ledger & Writings	.70	@	.80
Solid Books	.60	@	.70
Blanks	1.00	@	1.05
Krafts	.80	@	.90
New Kraft Cuts	1.20	@	1.30
Manila Env. Cuts	1.25	@	1.30
Ex. No. 1 Manila	.90	@	1.00
Print Manila	.40	@	.50
Overissue News	.40	@	.45

Old Newspapers—

No. 1	.30	@	.35
No. 1 Mixed Paper	.25	@	.30

Roofing Stocks—

No. 1	30.00	@	—
No. 2	28.00	@	—

PHILADELPHIA

Paper

Rag Content Bond & Ledgers—
Delivered Zone 1

	Bonds	Ledgers
100% Rag Ext. No. 1	.36	.37
100% Rag	.28	.29
75% Rag	.21	.22
65% Rag	.18	.19
50% Rag	.15	.16
25% Rag	.12½	.13½

Sulphite Bond & Ledgers—
Delivered Zone 1

	Bonds	Ledgers
No. 1 Sulphite	7.75	8.75
No. 2 Sulphite	6.75	7.75
No. 3 Sulphite	6.00	7.00
No. 4 Sulphite	5.50	6.50

F.o.b. Mill

Book, M. F.	.05¼	@	.06¼
Book, S. S. & C.	.05½	@	.07½
Book, Coated	.06½	@	.09
Coated Lithograph	.06¾	@	.08½
No. 1 Jute Manila	6.25	@	—
Manila Sul., No. 1	5.25	@	—
Manila No. 2	3.75	@	—
No. 1 Kraft	5.00	@	—
Southern Kraft	4.75	@	—
News Print Rolls	40.00	@	—
Straw Board	40.00	@	45.00
News Board	40.00	@	—
Chip Board	37.50	@	—
Wood Pulp Board	70.00	@	85.00
Binder Boards—			
No. 1, per ton	75.00	@	80.00
No. 2, per ton	70.00	@	75.00
Carload lots	65.00	@	70.00
Tarred Felts—			
Regular	52.25	@	54.25
Slaters (per roll)	.84	@	.94

Domestic Rags (New)

(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White, No. 1	.06½	@	.07
New White, No. 2	.04½	@	.05
Light Silesias	.04	@	.05
Silesias, No. 1	.04	@	.04½
Black Silesias, soft	.03	@	—
New Unbleached	.06½	@	—
Washable, No. 1	.02	@	.02½
Blue Overall	.05	@	.05½
Cottons—According to grades—			
Washable, No. 2	.02½	@	.04½
New Blue	.02	@	—
Fancy	.01½	@	.02
New Black Soft	.04¼	@	—
New Light Seconds	.04	@	—
New Dark Seconds	1.10	@	—

Khaki Cuttings—

No. 1 O. D.	.04	@	—
No. 2 Mixed	.03	@	.04
Corduroy	.01¾	@	.02
New Canvas	.03½	@	.04½
New Black Mixed	.02¼	@	.02½

Domestic Rags (Old)

White No. 1—

Repacked	3.50	@	4.00
Miscellaneous	2.50	@	3.25
Thirds and Blues—			
Miscellaneous	1.75	@	2.00
Repacked	2.50	@	2.75
Black Stockings (Export)	4.50	@	5.00
Roofing Stock—			
Foreign No. 1	1.10	@	1.20
Repacked	1.30	@	1.50

Bagging

(F. o. b. Phila.)

Gunny, No. 1—			
Foreign	1.75	@	—
Domestic	2.00	@	—
Manila Rope	2.50	@	—
Sisal Rope	1.25	@	1.50
Mixed Rope	1.00	@	1.10
Scrap Burlaps—			
No. 1	2.00	@	2.25
No. 2	.80	@	.90
Wool Tares, heavy	3.00	@	3.25
Mixed Strings	1.00	@	1.10
No. 1 New Light Burlap	2.25	@	2.50
New Burlap Cuttings	2.00	@	2.25

Old Papers

(F. o. b. Phila.)

Shavings—			
No. 1 Hard White	2.25	@	2.30
No. 2 Hard White	1.90	@	2.00
No. 1 Soft White	1.80	@	1.85
No. 2 Soft White	1.25	@	1.30
No. 1 Mixed	—	@	.75
Solid Ledger Stock	1.50	@	1.60
Writing Paper	1.00	@	1.10
No. 1 Books, heavy	.55	@	.60
No. 1 New Manila	1.50	@	—
Print Manila	.50	@	.60
Container Manila	—	@	.50
Old Kraft	1.00	@	—
No. 1 Mixed Paper	—	@	.30
Straw Board Chip	.40	@	—
Binders Board Chip	.40	@	—
Corrugated Board	.55	@	—
Oversisse News	.60	@	—
Old Newspapers	.40	@	—

BOSTON

Paper

Rag Content Bond & Ledgers—
Delivered Zone 1

	Bonds	Ledgers
100% Rag Ext. No. 1	.36	.37
100% Rag	.28	.29
75% Rag	.21	.22
65% Rag	.18	.19
50% Rag	.15	.16
25% Rag	.12½	.13½

Sulphite Bond & Ledgers—
Delivered Zone 1

	Bonds	Ledgers
No. 1 Sulphite	7.75	8.75
No. 2 Sulphite	6.75	7.75
No. 3 Sulphite	6.00	7.00
No. 4 Sulphite	5.50	6.50

F.o.b. Mill

Book, Super	.06	@	.09
Book, M. F.	.05½	@	.08½
Book, Coated	.08½	@	.18
Coated Litho	.09	@	.12
Jute Manila No. 1	.11	@	.13
Manila, Sul. No. 1	.04¾	@	.06¼
Manila, Sul. No. 2	.03¾	@	.04½
No. 1 Kraft	.04¾	@	.05
No. 2 Kraft	.04½	@	.04¾

(F. o. b. Boston)

Southern Kraft	.03½	@	.04½

(F. o. b. destination in carload lots, f. o. b. mill in less than carload lots)
(Delivered New England points)

News Print Rolls	39.50	@	—
Straw Board, rolls	.009	—	@35.00
Filled News Board	40.00	@	45.00
Chip Board	37.50	@	40.00
Single Manila Lined Chip	47.50	@	52.50
Single White, Patent Coated News Board (Bender)	55.00	@	65.00
Wood Pulp Board	70.00	@	75.00
Binder Boards (Standard Grade)	67.00	@	75.00

Old Papers

(F. o. b. Boston)

Shavings—

No. 1 Hard White	2.00	@	2.20
No. 1 Soft White	1.75	@	1.90
No. 2 Mixed	.75	@	.80
Solid Ledger Books	1.40	@	1.50
Overissue Ledger Stock	1.15	@	1.30
Mixed Ledgers	.85	@	.90
No. 1 Books, heavy	.55	@	.65
No. 1 Books, light	.50	@	.60
Crumpled Stitchless Book Stock	.50	@	.60
Manila Env. Cuttings	1.50	@	1.60
No. 1 Old Manila	.60	@	.65
White Blank News	1.25	@	1.30
No. 1 Kraft	1.05	@	—
Mixed Papers	.22½	@	.25
Print Manila	.50	@	.60
Container Manilas	.27½	@	—
Old Newspapers	.25	@	.27½
Overissue News	—	@	.35
Box Board Chips	—	@	.25
Corrugated Boxes	.35	@	.37½
Kraft corrugated boxes	.85	@	—
Screening Wrappers	.40	@	.45

Bagging

(F. o. b. Boston)

Manila Rope—			
Foreign	2.00	@	2.25
Domestic	2.10	@	2.25
Transmission Rope	.90	@	1.00
Jute Rope	2.00	@	2.25
Jute Carpet Threads	1.00	@	1.10
Gunny No. 1—			
Foreign	2.00	@	2.25
Domestic	1.80	@	2.00
Bleachery Burlap	4.00	@	4.50
Scrap Burlap—			
Foreign	1.95	@	2.00
Domestic	1.60	@	1.75
Scrap Sisal	1.85	@	1.95
Scrap Sisal for Shredding	2.00	@	2.10
Wool Tares, heavy	2.00	@	2.10
New Burlap Cuttings	2.25	@	2.35
Australian Wool Pouches	3.00	@	3.25
Heavy Baling Bagging	2.50	@	2.75
Paper Mill Bagging	1.20	@	1.35
Bagging No. 2	.90	@	.95

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	.01¼	@	.02
New White No. 1	.06¾	@	.07
New White No. 2	.04	@	.04¼
Silesias No. 1	.04½	@	—
New Black Silesias	.02½	@	.03
Soft Unbleached	.06¾	@	.07
Blue Cheviot	5.25	@	5.50
Fancy	.0225	@	.023
Washable	.0165	@	.0170
Cottons—According to grades—			
Blue Overalls	5.25	@	5.50
New Black, soft	.04	@	.04¼
Khaki Cuttings	.04	@	.04¼
O. D. Khaki	.04	@	.04¼
Corduroy	.01¾	@	.02
New Canvas	—	@	.05
B.V.D. Cuttings	—	@	.06¼

Domestic Rags (Old)

(F. o. b. Boston)

Canvas	.04½	@	—
White No. 1—			
Repacked	—	@	2.75
Miscellaneous	2.50	@	2.75
White No. 2—			
Repacked	1.90	@	2.00
Miscellaneous	2.00	@	2.25
Twos and Blues	1.50	@	2.00
Thirds and Blues—			
Repacked	1.37½	@	1.75
Miscellaneous	1.25	@	1.62½
Black Stockings	2.50	@	3.00
Roofing Stock—			
No. 1	1.40	@	1.50
No. 2	1.25	@	1.35
No. 3	.95	@	1.00

Foreign Rags

(F. o. b. Boston)

Dark Cottons	1.60	@	1.70
New White Shirt Cuttings	6.50	@	6.75
Dutch Blues	2.25	@	2.50
New Checks & Blues	2.50	@	3.00
Old Fustians	1.90	@	—
Old Linsey Garments	2.10	@	—
New Silesias	4.50	@	4.75

TORONTO

Paper

(F. o. b. Mill)

Bond—			
No. 1 Sulphite	.11	@	—
No. 2 Sulphite	.08½	@	—
No. 1 Colored	.12	@	—
No. 2 Colored	.09	@	—
Ledgers (sulphite)—			
Ledgers, No. 1	.34½	@	—
Ledgers, No. 2	.25½	@	—
Writing	.09	@	.09½
Book—			
No. 1 M. F. (Carloads)	6.50	@	—
No. 2 M. F. (Carloads)	6.00	@	—
No. 3 M. F. (Carloads)	6.00	@	—
No. 1 S. C. (Carloads)	7.00	@	—
No. 2 S. C. (Carloads)	6.50	@	—
No. 3 S. C. (Carloads)	6.50	@	—
No. 1 Coated and Litho	12.00	@	—
No. 2 Coated and Writing Paper	10.50	@	—
No. 3 Coated and Litho	9.50	@	—
Coated tinted	13.00	@	—
Wrapping—delivered—			
Rag Brown	4.75	@	—
White Wrap	3.50	@	—
"B" Manila	5.25	@	—
No. 1 Manila	5.40	@	—
Fiber	5.40	@	—
Kraft, M. F.	5.90	@	—
Kraft, No. 2	5.40	@	—

(F. o. b. Cars Toronto)

News, per ton—			
Rolls (contract)	39.50	@	—
Sheets	44.50	@	—

Pulp

Ground wood	27.00	@	—
Unbleached Sulphite	42.00	@	—
Book (Class 1)	58.00	@	—
Writing (Class 2)	59.00	@	—
Select (Class 3)	60.00	@	—

Old Waste Paper

(In carload lots, f. o. b. Toronto)

Shavings—			
White Env. Cut	2.00	@	2.25
Soft White	1.60	@	1.90
White Blk. News	1.25	@	1.40
Book and Ledger—			
Flat Magazine and Book Stock (old)	.90	@	1.00
Light and Crumpled Book Stock	.80	@	.90
Ledgers and Writings	1.00	@	1.05
Manilas—			
New Manila Cut	1.25	@	1.40
Printed Manilas	.50	@	.60
Kraft	1.00	@	1.60
News and Scrap—			
Strictly Overissue	.55	@	—
Strictly Folded	.50	@	—
No. 1 Mixed Paper	.40	@	—

Domestic Rags

(Price to mills, f. o. b. Toronto)

No. 1 White Shirt Cuttings	.06¾	@	.06½
Fancy Shirt Cuttings	.02¼	@	.02½

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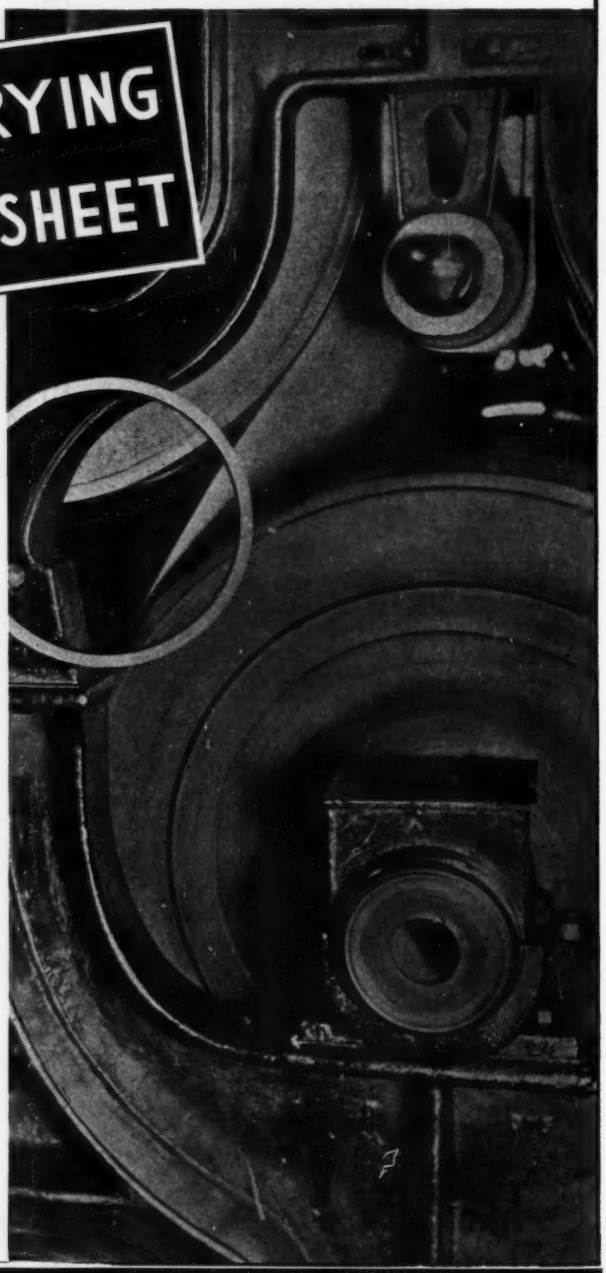

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